Computerworld

DEC. 7, 1983
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OFFICE AUTOMATION

COMMUNICATIONS

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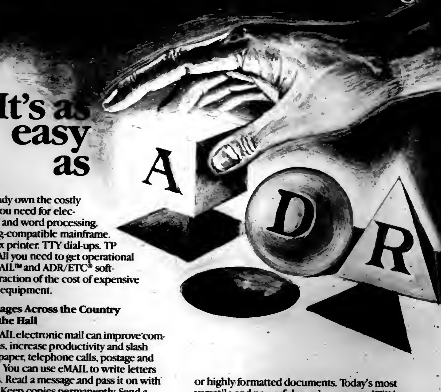

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Communications is a catalyst for the integrated office. Capabilities are developing rapidly, and users need to stay on top of the issues and technologies. (Photo © 1983 George Dillon)

COMPUTERWORLD
OA

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OA
COMMENT

Nobody ever said it would be easy. But why does it have to be so hard? And when it comes to putting together an integrated communications system, it doesn't seem as though it's going to get any simpler, either. The number of choices in communications technologies is resulting in advanced office systems being developed on a piecemeal basis. An integrated system is critical, but because the best technology for interconnecting the office has yet to appear, that system is nearly impossible to achieve today.

The current state of communications is at best confusing and at worst a disaster waiting to happen. The controversy over baseband and broadband has subsided, only to be replaced by a discussion over whether the preferred option is the PBX, the local-area network or a combination of the two. Voice and data are only beginning to be merged, and we won't see a workable answer to that for some time. Satellite technology, wide-band networks and gateways have not yet stood the test of time by achieving wide user acceptance and usage.

In addition, the AT&T breakup has plunged both vendors and users into a quandary. All are waiting to see what will happen when the split between AT&T and the operating companies is complete.

Another aspect of the communications dilemma is a result of the personal computer explosion. Although personal computers started out as standalone devices, users very quickly sounded the cry for communications capabilities to the mainframe data base. Satisfying this demand will require careful planning, and the answer to the micro-mainframe link (even with IBM's recent announcement) is not yet completely satisfactory.

Even standards are not the communications Messiahs some people want them to be. Even after they have been agreed upon and accepted, standards alone cannot be expected to be complete solutions to the diverse communications problems that are so often specific to an individual company.

No one strategy will integrate the various communications devices and networks. Once again, it is up to users to make do. The best strategy for users today is to plan very carefully for an open systems architecture to facilitate all their communications needs — both the known quantities of today and the unknown and not-yet-thought-of business and communications needs of tomorrow.

Hopefully, this flexibility will enable them to adapt when communications technologies do mature.

FORUM

By Karen Rancourt

A new burden has been placed on DP personnel. Many non-DPers assume that, because DPers work with computers, most if not all of them must be office automation experts.

Many of my conversations begin like this: "So, how's it going with OA?" The middle part of this exchange has some variations, but, finally, at some point the other person in this conversation will blurt out — always in exasperation — "Exactly what the hell is office automation?"

Their relief becomes apparent when my initial response underscores the fact that there is no one universally accepted definition of OA and there probably never will be. Talk to an OA vendor and OA is that company's product line. Ask a financial analyst, and OA is a user-friendly electronic spreadsheet. Ask a salesperson and OA is the fastest way to book an order. It all depends on who's answering the question.

Nevertheless, the most important point to be made about OA is that while it does include hardware, software, technology and tools, it is more than that. OA must be viewed as a process, an activity, if its true potential is to be realized. For example, if you were on a business trip (an activity, yes?) and you were asked how your trip was, it would be a narrow response if you focused on the plane you took, the car you rented and the subways you used to get around the city. This tells us something about how you traveled, but it tells us nothing about why you were traveling and what you hoped to accomplish.

Many attempts at understanding OA have a similar limitation; we talk about how we're going to do something faster and more efficiently and we stop there.

At some point we need to consider not those information processing tasks that can be automated, but why we are doing them in the first place. In other words, what is the business of your office? Why does someone continue to keep you on the payroll? What do you need to do to have your senior management look at your accomplishments and say, "You Have Been Successful."

Increasing the number of memos created from six to 10 is probably not going to get you kudos from senior management, but pinpointing bottlenecks in your information processing and doing

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FORUM

something that increases your effectiveness probably will.

In any discussion on OA, it is important to note the differences between efficiency and effectiveness. If you are cranking out irrelevant paperwork, OA can probably help you crank it out in less time than it is presently taking you. But who wants to be remembered for being efficiently ineffective? Definitely not good epitaph material.

It is obvious that OA's greatest potential should be in increasing our business effectiveness. When we have figured out what we need to do, then it makes sense to concentrate on improving how we do it. Office automation has stemmed from interchanging and reversing these priorities — trying to improve efficiency before defining exactly what has to happen to make us effective businesspeople.

In addition, a third factor, productivity, needs to be considered also. Beware of anyone who guarantees that "OA is going to increase your productivity." There is a raging, polarized battle taking place about this issue of OA and productivity. One camp takes the position that "if it can be done, it can be measured." Another takes the position that creating, massaging and interpreting data and information require skills that are difficult, if not impossible, to assess in terms of productivity.

It is easy to see the merits of both positions. Traditional approaches to productivity (especially those developed with regard to manufactured products) that establish baselines and I/O ratios are not easily transferred into information processing arenas. Yet, if something is a bona fide accomplishment with a stated beginning and ending, there should be some methodology for measuring it.

It is safe to say that newer and more appropriate ways of defining and measuring knowledge productivity will eventually emerge and make the above dichotomy unnecessary. In the interim, participants in this type of discussion might want to acknowledge the complexity of the productivity-office automation issues and let it go at that.

How, then, can you define OA? A definition that has worked well for me is: "Office automation is an ongoing dynamic process comprised of people, organizations, technologies and tools, interrelated to meet business goals and objectives."

This definition is appropriate for many reasons. First, it packages OA as a process, an activity; this emphasis is important because it immediately removes the typical tendency of the initiated to equate OA exclusively with hardware and software.

This working definition views OA as a nonstatic process. This is significant because it points out that OA must be flexible — always subject to modification and enhancement as the interplay changes between people, organizations, technologies and tools.

In short, once a commitment is made to explore OA possibilities, the commitment and resulting decisions must be periodically revisited.

All too often, attempts are made to force-fit people and their organizations with available technologies and tools. This happens because a basic and important underlying principle is either misunderstood or ignored.

It is too convenient to say "Well, people by nature resist change." People do not resist change for the sake of resisting change; they resist change when they do not understand why it is being introduced or what its benefits are supposed to be. If the change being introduced is not understood by those it will affect, morale and productivity can plummet and attempts will be made to make it appear as if the change itself is at fault. In reality, it is the process used to make the change which is preventing successful integration.

It is amazing how obvious the importance of this dictum is and how decision makers continue to violate it. Stated simply, all OA explorations and decisions should involve the people OA will ultimately affect.

Finally, our definition requires a constant tie-in with the business goals and objectives for which a group or organization are accountable. OA decisions are dependent upon these business goals and must reflect procedural or action steps taken to help reach them.

In other words, the stated business goals and objectives of a group or organization address what needs to be accomplished. The office automation process can help address how to accomplish them. OA

Many of my conversations begin, "So, how's it going with OA?" Finally, at some point the other person in this conversation will blurt out — always in exasperation — "Exactly what the hell is office automation?"

Rancourt, who holds a Ph.D., works for Wang Laboratories, Inc. She is presently establishing an OA resource center for the international management information systems group.

LETTERS

Ecom: Yes, But . . .

The generally laudable content of *Computerworld OA's* article on the Postal Service's Electronic Computer Originated Mail service ("Ecom — How Special the Delivery?" August 1983) is diluted by a series of inaccuracies. We would like to clarify those inaccuracies in order to guard against a common problem that has plagued our Ecom system — the recycling of misinformation about Ecom, its evolution and its posturing by the Postal Service.

Early on, the article states the "initial motivation" for Ecom "sprang from a general dissatisfaction of the U.S. Postal Service." In truth, Ecom arose from the Postal Service's mandate to use the best available technology for the efficient transportation of the mails. The commitment to this mandate has helped the Postal Service achieve a high level of satisfaction rating in a recent Roper poll. (A far cry from the author's claims of general dissatisfaction.)

The assertion that Ecom emerged as a result of "extensive study done for the post office by RCA" is a misinterpretation of what those studies were designed to accomplish. RCA's studies related to an Electronic Mail Message System, which was dropped after the RCA studies and which bore little resemblence to the present Ecom system.

The article also asserted that the Postal Service has operated in the red since 1945; in fact, in fiscal years 1979, 1982 and 1983, the Postal Service recorded surpluses. In the past six years of operations, the Postal Service's surplus years have almost exactly offset its deficit years in the period. In effect, the service has broken even.

The article suggests a "fully mature" Ecom system will handle 25 billion to 50 billion pieces of mail annually. The Postal Service estimates that 500 million pieces of first-class mail now have the potential to be transported via telecommunications and Ecom. Although we expect some very healthy growth in the future, we do not anticipate growth to the range of 25 billion to 50 billion pieces. Those numbers are higher than any known current estimate.

The explanation of the "USPS processing station" — what we call a Serving Post Office — arbitrarily assigns the functions of the private sector carriers to Ecom operations. It is, in fact, Ecom carriers certified to input Ecom messages to our 25 Serving Post Offices who handle "a variety of magnetic tape, floppy diskettes . . . (or) hard-copy information . . . hand carried to their site for input."

The Postal Service's role is no more than to receive the electronic transmissions of the carriers, convert the impulses into hard-copy messages and automatically insert them into envelopes for delivery as first-class mail within two working days if received before midnight — not 5:00 p.m.

The most serious error of substance occurred when the author reported that "Serving Post Offices communicate the electronic mail to other processing stations through a combination of satellite and Bell Digital Data Service links." The Postal Service has *absolutely no electronic linkage* for message transmission between its Serving Post Offices. Moreover, we have no development programs under way.

There is a subsequent statement regarding what the author claims is a "rigorous certification process." This might have been true initially, but for the past year, certification procedures and requirements have been greatly simplified, including eliminating the requirement for users to test in all three formats. A potential user need only transmit test messages in the format intended for use. In addition, we have trained more technical representatives to assist firms applying for certification to facilitate and substantially shorten the entire process.

In balance, the article did a good job of explaining the Ecom system to *Computerworld OA* readers.

Karen T. Uemoto
Director
Office of Ecom Operations
U.S. Postal Service
Washington, D.C.

Spinning Plates

In the article on integrated Software [CW OA, Oct. 12], the definitions of multitasking and multiprocessing are mutually indistinguishable.

Although it is true that a multitasking system may share processor power among multiple applications, it is also true that such a system may share processor power among multiple tasks within the same application (if the application is sufficiently sophisticated).

The distinction is not a trivial one. The spinning plate analogy offered for multiprocessing is actually appropriate to multitasking, but is not appropriate to multiprocessing.

The key attribute of multiprocessing is the existence of multiple processors within a single system, thus providing an environment wherein true simultaneous processing is possible. To expand the spinning plate analogy to a multiprocessing environment requires that more than one performer (processor) be dispatched to keep the various plates (processor or tasks) spinning.

Robert C. Meltzer
Proprietor
RCM Software
Kettering, Ohio

OA NEWSBRIEFS

MAYNARD, Mass. — For Digital Equipment Corp., Oct. 18 will be remembered as "Black Tuesday." Caught by surprise, DEC hastily announced that its first-quarter earnings would be sharply lower than expected (the drop turned out to be 72%).

The announcement set off a massive selling of DEC shares on the New York Stock Exchange, and the company's stock fell more than 21 points for the day. In a space of three days, DEC fell a total of more than 32 points to a 12-month low of 67.

The company reported that net earnings fell to $15.9 million, or 28 cents a share, from $56.8 million, or $1.02 a share a year earlier. Revenues rose 16% to $1.07 billion from $927.5 million.

The company said lower earnings were the result of smaller-than-expected shipments of personal computers and from the inability to manufacture and ship new products.

WASHINGTON, D.C. — MCI Communications Corp. has launched a nationwide electronic postal system that reportedly makes possible high-speed delivery of letters and other written communications. The system is said to position MCI as a major competitor to overnight mail delivery services.

Called MCI Mail, the telecommunications-based system offers a variety of delivery systems, including instant delivery, four-hour delivery, overnight delivery by noon and next-day delivery by local regular mail.

The system reportedly can deliver mail anywhere in the continental U.S. at prices as much as 90% lower than comparable time-sensitive mail services.

According to MCI, the new system also places the company in the market for electronic mail generated by personal computers, word processors, electronic typewriters and data terminals.

NEW YORK — AT&T has decided to make major changes to its Picturephone Meeting Service in hopes of making videoconferencing a commercial success, according to a report in the *Wall Street Journal*.

The Picturephone Meeting Service, introduced in 1981, has not met AT&T's expectations and the company has decided to switch suppliers for the two-way equipment, which alters television signals into a form that can be transmitted between distant conference rooms. The new equipment is considered to be more efficient than that currently used by AT&T.

AT&T signed an agreement with Compression Labs, Inc., a San Jose, Calif. firm. Compression Labs will supply an AT&T unit with a new video system for installation in AT&T's Picturephone Meeting Service conference rooms, which are open to the public and for private use by corporations.

ROCHESTER, N.Y. — Xerox Corp.'s Service Group has announced that it will provide service for Osborne personal computers.

Under an agreement between Osborne Computer Corp. and Xerox, full authorized service will be provided nationwide for Osborne I and Osborne Executive I portable computers under the Xerox Americare service program.

The agreement was reached as a result of the continuing financial troubles of Osborne, which filed for bankruptcy in September.

Current Osborne owners who have had extended warranties validated by Osborne before Sept. 13 have been assured of full-service coverage, provided they purchase a two-year Xerox Americare contract. Dealers will be given the opportunity to offer their customers one-year or two-year service contracts at the time of purchase of an Osborne computer.

CAMBRIDGE, Mass. — BBN Computer Corp. has changed its name to BBN Communications Corp. Company officials said the name change reflected the expanded product and service capabilities in the field of wide-area data communications.

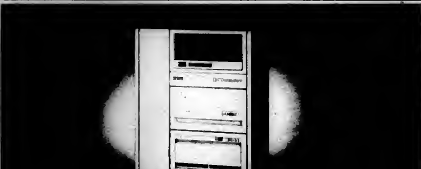
The company was founded in 1979 as a wholly-owned subsidiary of Bolt Beranek and Newman, Inc. to provide commercial products based on its research in network technology.

NEW YORK — By 1990, voice synthesis sales will be $1.45 billion and voice recognition sales will be $1.05 billion, according to a prediction made by the Diebold Group, Inc. management consultants.

Though 1982 sales of speech synthesis and voice recognition sales were only $65 million, Diebold said that dramatic cost-performance advances are being made to voice technology which will cause the market growth.

Diebold also announced that nearly 100% of 64 major corporations it surveyed on office automation had "near-complete penetration by word processing" and are progressing to broader usage within the organization.

The Diebold report "Stages of Growth in Office Automation," pointed out that it is no longer enough to design a simple office application for use within a limited environment. It is essential to think in terms of a comprehensive global system to support the organization's total needs.



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NEWSBRIEFS

Diebold also published a study on paths to success for major users of electronic mail. For more information contact The Diebold Group, Inc., 475 Park Ave. S., New York, N.Y. 10016.

NEW YORK — A directory that reportedly makes it easy for users of facsimile machines to reach each other has been announced by the Greenfield Information Services.

The facsimile directory lists corporations with their facsimile machine locations and telephone numbers. It also contains information on compatibility and personnel to contact.

Listings in the directory are free. The directory, which is scheduled to be published in early 1984, will cost $45. For more information contact Greenfield Information Services, 551 Fifth Ave., N.Y. t0t76.

WELLESLEY, Mass. — Price is only a secondary factor when a company is selecting office and communications equipment, according to a report by Venture Development Corp.

The study, "Office Automation Survey: Analysis of Acquisition and Use of Office and Communications Equipment," notes that the reliability of a machine, the available features or functions and the ease of use are the primary influences on a purchase decision.

The report costs $1.850 from Venture Development Corp., One Washington St., Wellesley, Mass. 02181.

WASHINGTON, D.C. — Can you use your portable computer on an airplane? In many cases, the answer is no.

The Federal Aviation Administration (FAA) has left the decision up to the individual airlines, and several large carriers have banned computers on their flights.

The fear is that the computers might interfere with the plane's electronic navigation equipment, although computer manufacturers and the FAA reportedly tend to doubt that possibility. Nevertheless, five airlines — American, United, Eastern, Western and Continental — have banned the use of computers in flight. For more information, contact the individual airlines.

WELLESLEY, Mass. — The private branch exchange (PBX) business dwarfs all other competing communications signal routing methods and will continue to do so for the foreseeable future, according to a study by Venture Development Corp. (VDC).

The study, "Competitive Signal Routing Methods," pointed out that even in t987, the PBX market will be 10 times as large as the local-area network market.

This will be the case despite the explosive growth forecast for local-area networks and the moderate growth forecast for PBXs, the report said.

The study is available for $2,790 from VDC, One Washington St., Wellesley, Mass. 02t8t.

NORWALK, Conn. — AT&T is planning to introduce a microcomputer system within the next six months, according to a report by International Resource Development, Inc. (IRD).

The 237-page report predicts that the system will be 32-bit architecture based on Western Electric's Bellmac microprocessor and that the software will be based on Bell Lab's Unix operating system. The report also predicts that this new system will upstage the IBM PC. IRD has additionally published a report forecasting severe disappointments for nonimpact printer manufacturers in the personal computer and office automation market segments.

The report, "Non-Impact Printers in the U.S.," said that low-cost, daisywheel and matrix-impact printers are becoming so inexpensive that many of the fancy new nonimpact printers are not finding buyers.

"Microcomputer Operating System Strategies" is available for $1,650 and "Non-Impact Printers in the U.S." for $985 from IRD, 30 High St., Norwalk, Conn. 06851.

MORRISTOWN, N.J. — *The Guide to Voice Store and Forward Systems* (2nd edition) is available from Probe Research, Inc.

The report evaluates voice store-and-forward systems and analyzes the major stand-alone, PBX-integrated, TAS/RCC-oriented and office-integrated system entries on the market, according to its publisher.

The guide is available for $165 from Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07690.

DELRAN, N.J. — The results of a survey of 6,000 microcomputer users are available from Datapro Research Corp. "The Datapro Reports on Microcomputers" rates systems, peripherals and software.

The report is said to cover 126 models from 57 vendors, 19 primary operating systems, t3 of the most popular software packages and 90 of the most popular peripherals. According to the survey, the most popular systems were the Apple II Plus, which accounted for 19.2% of total responses, and the IBM PC, with 13.7% of the responses. The report is available for an annual subscription fee of $600 from Datapro, 1805 Underwood Blvd., Delran, N.J. OA

ILLUSTRATION BY ANATOLY OVERIN

DSS & OA Insights & Challenges

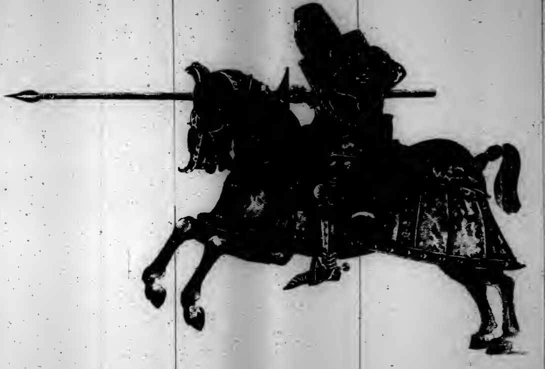
By Peter G.W. Keen

Many innovations stimulated by the decision support systems (DSS) movement since the late 1970s have now become standard aspects of data processing, management science and office technology. Now it is time to assess DSS' contributions to the overall application of information technology in organizations and to attempt to integrate DSS and DP instead of trying to define their differences.

The historical conflict between DSS and DP really reflected some early warning signals to DP that it needed to change its role and become more responsive to a broader range of potential clients. DP now faces some significant challenges, which are mainly being attacked on a piecemeal basis. However, the DSS experience offers substantial insight into these challenges and, often, solutions. The main problems DP faces are the following:

- The shift from a DP monopoly to a free market for computer services.
- A shortage of personnel for systems development at a time of exploding demand for information systems.
- The need and desire to create a data architecture for the organization.
- The need to define a strategy for office automation.

The emergence of the free market is a particular dilemma. DP has had substantial or even



full control over the acquisition and direction of information technology. Its costing methods, planning practices and management processes have been monopolistic.

Suddenly, DP has had to adjust to a situation where almost any type of service is available from outside suppliers, and user managers are no longer willing to rely solely on DP. The breadth and quality of these services, especially in the area of end-user languages, microcomputers and financial planning packages, challenge the DP monopoly to revise its strategies, priorities and management practices. It has to move from being a manufacturing and operations department to becoming an information company, focused on marketing, service and product development.

In many ways, DSS was the first free market effort. They are discretionary systems: Managers do not have to use them. As a result, DSS designers had to learn from the very beginning how to appeal and sell to a "consumer" who may have had little or no experience with computers.

The lessons to be learned are invaluable for DP:

- Development has to start from the customer's perspective and must be based on direct and empathic study of work, workers and the organizational context of work.
- The decision to adopt an innovative information system is based on value, not cost.
- Complex systems can be evolved from well-phased simple components, thus reducing risk and speeding up delivery.
- End-user languages and fast development tools (such as APL and application generators) provide the base for responsive service, especially to meet ad hoc needs.

The DSS implementor's skills are exactly those that DP needs to complement its abilities in formal project management, disciplined testing and installation of large systems — valuable practices too often not demonstrated by DSS builders!

The shortage of development staff — business-oriented analysts even more than programmers — is the major single constraint on DP's ability to

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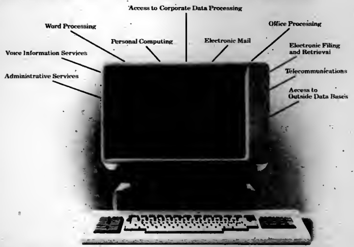
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meet demand for information systems.

In the short term, the problem will get worse, not better. Current backlogs often amount to several years. Maintenance takes 50% to 70% of personnel. Hidden backlogs — systems that line units need, but do not bother to ask for because they know DP cannot deliver them — can be measured in man-centuries. More important, many factors are increasing demand: the free market; the rapidly improving quality and costs of hardware, software and communications; increasing expectations and sophistication of users; and the growing potential and actual contribution of information technology to key aspects of decision making, business and operations. Outside companies and entrepreneurial ambitions drain off skilled DPers.

At present, the only way out of this problem is to shift from programming languages, which require DP personnel, to end-user tools that allow nonprogrammers to develop their own systems with only limited support from DP. Examples of such tools include financial modeling languages, inquiry languages and report generators and interactive graphics packages.

The DSS experience has much to offer DP in resolving the first two problems: responding to the free market and shifting to end-user tools. The third problem, the definition of a data architecture, is an area where, if anything, DSS have confused the issue and perhaps even impeded progress. The term "architecture" is used here with the same meaning as with network architecture: a clearly-defined general structure, set of protocols and standards, and hierarchy or set of layers that provide a blueprint for specific implementations.

DSS have generally been most effective in applications involving models that need only a little data. The early enthusiasm of DSS builders for APL reflects this. The result has often been ad hoc data management, informal data bases and little effort to draw on DP's data resources.

Gradually and in a piecemeal fashion, DP is evolving a data architecture toward a state where the term "information resource management" is actually meaningful. Until recently, the set of tape and disk files (measured in acres of real estate occupied, rather than in megabytes or gigabytes) was not a resource worth managing. It consisted of information that was available but not accessible.

Information resource management goes well beyond data base management software. It includes new organizational roles and procedures; a business-based model of information flows and uses; and, in effect, an accounting system, vocabulary and discipline for managing data equivalent to that for managing the financial resource.

If DSS has much to offer DP about ways to operate in the free market, DP has even more to teach DSS about data management. At times, DSS has seemed to focus on models without data and DP on data without models (and the analytic frameworks they reflect).

DP's fourth problem is to define a real strategy for OA. Plenty of promises, expectations, pilots, frameworks, buzz words and ads exist, but very few companies have evolved a coherent, organizationwide strategy. Tactics dominate and vague terms like "productivity" and "office of the future" substitute for demonstrated commitment, plans, implementation and payoff. In many ways, DSS has been the dry run for office automation — or rather office technology, a more general term that recognizes

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The DSS implementor's skills are exactly those needed to complement DP's abilities in formal project management, disciplined testing and installation of large systems.

we cannot and should not automate office activities, but will support them.

Information resource management is the integration of DSS, DP and office technology. The problems described above have been creeping up on DP for some time. Too often, it openly reacted like a plant manager. DP executives and their staff saw their jobs as keeping the assembly line running, being efficient and juggling some incredibly complex short-term pressures: operations, maintenance, fire-fighting and project management. Innovations like DSS were seen as diversions — or intrusions.

Today, many of the ideas of DSS seem commonsensical. In 1975 when the movement built up momentum, they seemed radical.

DSS began its intrusion with a tremendous advantage in technology: the terminal. It quickly extended this advantage by focusing on fast development languages, such as Express and APL. At that time, DP was virtually locked into batch processing and traditional programming languages, especially Cobol. It could not quickly or easily shift its technical base.

DSS builders began with a technical base that allowed them, in Gulden and Arkush's phrase, to "cherry pick." They were able to take easy applications — an ad hoc model in two days, an APL simulation of the creation of the universe in five lines of code and 30 hours, a working prototype in a day and new routines added overnight.

A lot of the success of DSS has come from boasting about such small systems, from being in the right place with the right application concept and from understanding what to work on, with fast flexible development tools. DSS builders need to stop talking about how effectively they can build the little systems — DP has picked up on that technology. Anyway, using APL, anyone ought to be able to develop a model in one-tenth the time required in Cobol or Fortran.

Another aspect of DSS as intruder is that it is primarily not a technical concept, but one of application. It hit DP from the side; DSS emphasized the need for functional expertise — understanding of marketing, finance or strategic planning. DSS broke open the traditional communication patterns and relationships between builders and users of information systems; it bypassed the formal DP organization and went directly to users.

In the long term, that can cause fragmentation of effort and loss of coordination. At the same time, however, these processes created a new class of customer and set standards of service and responsiveness that have significantly contributed to changing managers' views of computers — from seeing them as a problem to recognizing them as an opportunity.

Perhaps the most important aspect of the DSS intrusion for the long term is its focus on what people with no technical background like to do at terminals.

DSS are discretionary systems: managers can choose to use them or ignore them. They can adapt them to their idiosyncratic needs and styles of thinking. Providing discretionary systems was not part of DP's mission. DP was in the business of providing mandatory systems — systems that have to be used as part of the organization's ongoing operations.

When the user can simply ignore the system, designers focus very carefully on features that entice consumers to buy their services and products — flexibility,

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ease of use, low cost and convenient access. Lacking an organizational base, DSS had to see the "user" as a real person.

The overall goal of office technology is to diffuse terminals throughout the organization and to persuade people to use them for key aspects of their work — communication, queries, text-handling, analysis and administration. Office technology and DSS are now basically identical, and DSS was the dry run for office technology. Office technology looks remarkably like DSS, with an important exception — it is not an intruder. DP is obviously looking for the opportunity to take charge of office technology, the major potential source of massive organizational productivity gains in the mid-1980s.

Office technology grows by pilots, research and development, prototypes and learning. This is the knowledge base of DSS. DSS designers' skills are of fundamental value if DP wants to take the technical tools of office technology and have them accepted quickly and institutionalized. Applications of modern information technology stand or fall by flexibility and ease of use. An inflexible system is one that has a potential use not accommodated in the design. Some aspect of the nature of the task and its context was overlooked or misunderstood. Similarly, ease of use requires close contact with the direct understanding of users and uses. Perhaps the key single characteristic of DSS builders is their willingness to learn how things work; to find out how people think and do their jobs and to get to know the organization. It is mainly this attitude that has shaped DSS design techniques, by which complex systems are evolved out of simple components.

Office technology integrates DSS and DP — neither can really contribute to office technology by itself. DSS is the experience base. But if it is indeed the dry run for office technology, it has been finessing a key issue: the difference between strategy and tactics. With office technology, most companies have at least abandoned the all-or-nothing approach to systems building, in which complex innovations are launched with no market research or pilots, but with delivery dates of next month.

Unfortunately, many of them never get beyond pilots and initial fragmented applications. They get stuck in tactics. There are few organizations with a real strategy for office technology, but many with lots of applications. Strategy requires a mandate for the use of the computing resource, clear business criteria for selecting and evaluating opportunities, and a well-defined long-term commitment. The real issue is authority, for planning and for pushing down a business vision to all levels of the organization.

DSS almost entirely lacks such a mandate. Very few DSS groups have gone beyond cherry picking to create a department with a charter. It is not enough to be building lots of systems.

The charter — or the opportunity to create it — is with DP. There has to be some overall coordinator of the computing resource, of which DSS is a facet. When DSS's skills and DP's organizational influence coalesce, strategy and tactics merge. OA

Keen is chairman of Micro Mainframe, Inc. in Cambridge, Mass. His current research lies in the areas of decision support systems, telecommunications and business policy and strategic computing education. In this article, he examines the events forming DSS and OA today. In the first issue of 1984, Keen will examine the role of DSS in the future.

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OFFICE AUTOMATION ROUND TABLE:
What's Next in OA?

How far off is real integration in the office? What will it mean to users when it does arrive? Three OA experts met with Computerworld OA*'s editor, Ann Dooley, to discuss what the integrated office will look like and how it will change the organizations and people who use these developing technologies.*

Rick Richardson is a partner in Arthur Young and Co.'s national office in New York and is responsible for directing the company's research and technology.

Will Zachmann is vice-president of corporate research at International Data Corp., a Framingham, Mass.-based research company.

John McQuillan, a consultant based in Cambridge, Mass., assists users and vendors in planning for OA and advanced communications systems.

What is the status of office automation today? Why hasn't implementation proceeded as quickly as was expected a few years ago?

McQuillan: If you try to add up the winners and losers, you'll see some interesting trends. Some things — personal computers and word processors, for example — are runaway winners. Others — electronic mail, local-area networks and voice — got off to a slow start. The rapidly implemented systems are small-scale, personal and local. The ones still to mature are the shared large-scale infrastructure systems that require central coordination. It's always harder for organizations to build roads and highways than it is for individuals to buy cars.

> **“*We need to begin strategic planning for OA even if it doesn't pay for itself.*”**

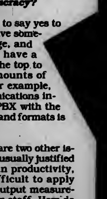
Rick Richardson ◆

Are you saying the problem is organizational bureaucracy?

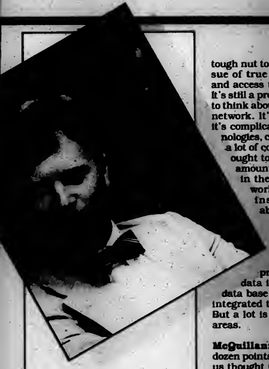
McQuillan: I'd have to say yes to that. You have to have someone who is in charge, and that person has to have a commitment from the top to spend the large amounts of money required. For example, installing a communications infrastructure like a PBX with the necessary protocols and formats is very expensive.

Richardson: There are two other issues. Automation is usually justified through increases in productivity, but it's awfully difficult to apply classical input vs. output measurement to white-collar staff. How do you begin to weight one better decision that keeps a firm from going off in the wrong direction and creating a whole host of problems? The second issue is that no one group within information technologies is really ready to run the gauntlet and go do it.

Zachmann: If you really look, some tremendous things have happened in OA. The most obvious ones are the surge of personal computers into large organizations and the tremendous growth in information center operations. Another area of tremendous activity has been in word processing. WP has moved out of a strictly specialized environment into the hands of lots of people who didn't do it before, on either strict word processors or personal computers. The



Will Zachmann ◆



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> ***Those who manage the OA transition effectively will be the winners in the future — others will just die.***
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tough nut to crack, though, is the issue of true local-area networking and access to corporate data bases. It's still a pretty scary thing to a user to think about putting in a local-area network. It's fairly expensive and it's complicated by competing technologies, competing standards and a lot of competing views of how it ought to be done. A tremendous amount of activity can be seen in the area of work area networks or typical Ethernet installations with only about eight or nine terminals attached. Access to corporate data bases has also been slow to take off, not for any hardware or software problem, but because the data in the central corporate data base is not in a form that is integrated to be readily accessible. But a lot is going on in both these areas.

McQuillan: We're in conflict on a dozen points already. A number of us thought OA would be more widespread by now. We believed we would all have fancier terminals on our desks and we'd be able to communicate in voice and data with more people, with more information and so on. There have been some very encouraging successes. I agree that the information services department is starting to have the organizational clout and charter to take some of the necessary actions — but the successes are still very small scale. I'm still looking for the key that is going to really open things up. I think its going to be the digital PBX, which

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> ***Most cost-justification in this business is really just a lot of garbage.***
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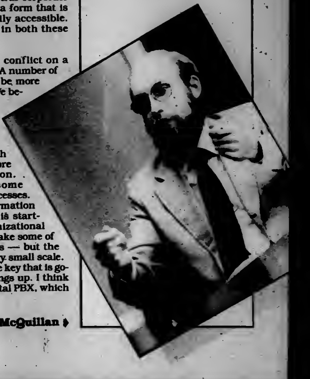

John McQuillan ▸

PHOTOGRAPHY BY SUSAN BLAKENEY

satisfies a lot of concerns — including cost-justification, for one. Other technologies will fall under the mantle of the PBX and it might turn out to be the keystone for integration.

Zachmann: We have a basis for an excellent point-counterpoint here!

I could not disagree more fundamentally. The digital PBX is a real ho-hummer in some ways. It provides no functional capacities of any significance that aren't already included in an existing telephone switch. People generally have a real desire to have some sort of panacea, some sort of fix-everything solution. Some basic limitations in the architecture of PBXs make them unsuitable for building the systems we really need.

The one important thing local-area networks provide — that PBX cannot and will not in the foreseeable future — is the ability to handle nonconnected high band with very high-speed burstitravel. And that's the key to building true systems of the future.

I think users are putting in local-area networks at a pretty good pace and that pace is now accelerating.

What are some of the other problems?

Zachmann: One of them is what happens when a tremendous amount of our communications is with people not on our system.

I'm still not convinced electronic mail even makes sense. The paper-based environment has made one important contribution: It's a classic standard of integration — we can all read it, put it in a briefcase and use it. And that's true no matter what technology we use to file it, copy it or save it away.

We have some horrendous leaps to make before we can make that statement about the electronic environment.

McQuillan: We also need to make the technology more intuitive. Using a computer should be like driving a car — once you learn it, it should come naturally. It will be quite a few years before that happens, but I'm an optimist.

Zachmann: The tools we're talking about should not be user-friendly, they should be user-transparent. We need systems that are natural extensions of the functional capabilities of the human being.

Some of this has already occurred. Personal computers proliferated because people started writing software that was easy to use and that provided solutions. The single package that deserves the most credit for this is Visicalc. Now we're seeing newer generations, like 1-2-3, that have overshadowed Visicalc.

Are you saying that as technologies become more user transparent and more sophisticated, their use will naturally spread?

Zachmann: I'm saying that three additional steps are needed for a successfully integrated system. The first is the user interface; the second is communications, which will probably involve a PBX and also local-area and work-area network technologies. The third is access to the corporate data base, and that's really a system development problem at the corporate data base.

"Using a computer should be like driving a car — once you learn it, it should come naturally."

Richardson: When the electronic tool stops being "a computer," corporate America's executives will really start using it. Another group — the diehard, power user base — will always use it. They are the people who just enjoy the technology and feel comfortable with it.

Zachmann: Learning Basic programming is going to be as fundamental a part of the educational process as learning multiplication tables was when we went to school. That is a fact. Anybody who doesn't believe that will happen is sitting in the world of the past.

Computer literacy is going to be coextensive with literacy two or three decades from now. In the modern world of the year 2000, literate, educated human beings are going to know how to program computers.

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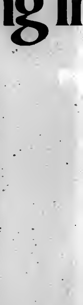

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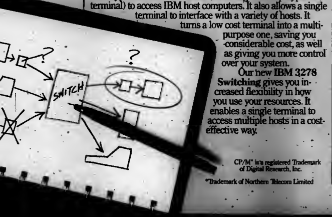

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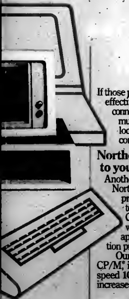

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The SL-1 digital system with **Integrated Voice Messaging** can. Internal and outside calls are automatically answered and messages recorded for retrieval at a convenient time. This new SL-1 digital system enhancement gives you an open voice messaging system that can quickly and easily put an end to lost messages and unanswered calls—and increase your organization's productivity.

It will meet your data nee
now and in the futur

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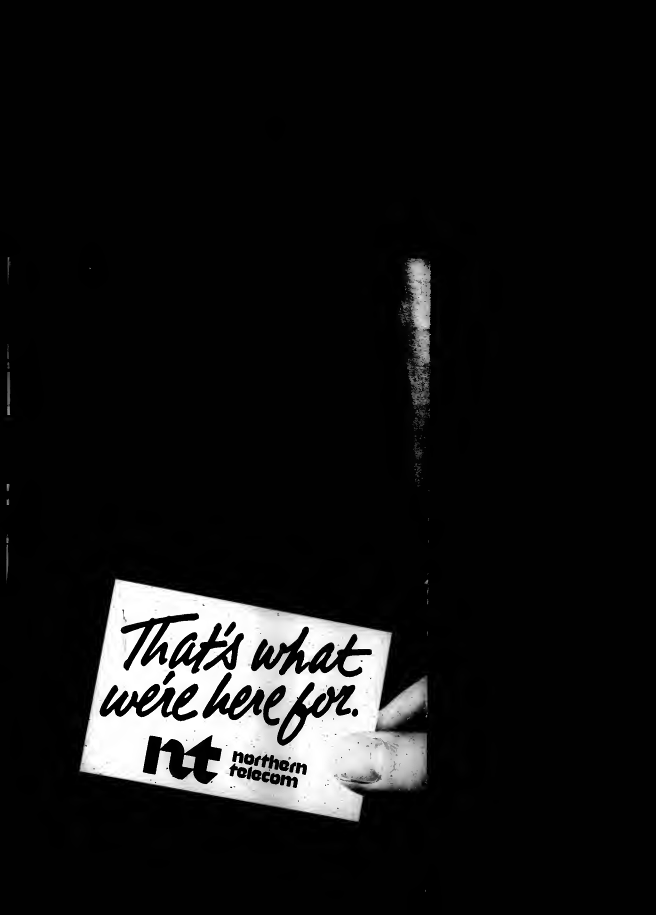
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“Now I know that tomorrow is covered. Thanks to the SL digital system.”

Richardson: The point I am making is that we are stepping onto a transition bridge between where we are now and where we would like to be when this whole infrastructure is built.

We don't have classes on how to use the telephone, it just happens. Electronic tools will eventually get to the level where computer literacy really isn't an issue any more. The interface will be so transparent that you will just use it, the same way you use anything else.

I'm not certain that in a generation anyone is going to get turned on by today's technology. We don't get turned on by the telephone — we just have one.

McQuillan: I agree that teaching programming has some value, but teaching the use of applications programs has a lot more. I'm not sure the penetration is going to be as high as we think in management ranks — quite a lot of managers don't deal with words and numbers. They deal with face-to-face meetings. They give judgments or impressions and have people who do things for them.

Richardson: The far more critical issue is that we aren't addressing the informal or shadow systems. For years, people have built up around their jobs a paper-based shadow system that does certain things. The micro has been a wonderful avenue of implementation to really automate these systems — systems that can never be a part of a major corporate data base because they need to be tailored to the way someone worked.

McQuillan: I think we've come up with an interesting point here. We have three factors, user transparency, communications infrastructure and corporate data base access. We all agree we need them, so that's not the issue. The issue is which is hardest? In what order do they come in and how are we going to have it all happen?

Transparency is important, but it's a gradual evolutionary phenomenon. The other two are more global decision-making processes that corporations need to make. Communications infrastructure is extremely difficult because it deals with a lot of different levels.

Data base access is particularly hard; not only is it an organizational technical problem, it's also a policy problem. We can be optimists about transparency and we can see the beginnings of success in communications infrastructure, but the data base access will be more of a problem.

Zachmann: I call it distributed resource systems. Instead of looking at the mainframe out, we did a reversal where we look from the desk out. The question is no longer "What can we take off the big computer and put somewhere else?" Now it's become "What can't the thing on the desk do? What does it have to go somewhere else to do?"

We are still applying the old models. We will really get off the runway on integrated office systems and building this electronic nervous system — the office of the future — when a change in thinking occurs. This will happen when people start building around the models of the future instead of taking new technologies and using them to sort of soup up the models of the past.

What about the people who are getting a little information now and want more, but can't get at it? Once they get a taste, they want a whole lot more. That's very frustrating, and it can even turn some users off.

"We have three factors, user transparency, communications infrastructure and corporate data base access. We all agree we need them, so that's not the issue. The issue is which is hardest? In what order do they come in and how are we going to have it all happen?"

McQuillan: I would say that the big obstacle is corporate planning and policies. A lot of corporations don't want people to do that now. They're afraid there will be seven versions of next year's salea forecast and no one of them will be completely correct — it's a consistency and security problem. People may just carry the floppy disks home in their briefcases.

There are technical obstacles, but that's the good news. The bad news is that the policy obstacles are much harder and they can't be solved by a faster and bigger or cheaper box.

People are developing corporate policies for personal computers and that's the first step. A lot of them, quite wisely I think, are writing these policies with a one-year time price. They are saying, "We're going to put this policy into place for a year, and probably use PCs. Then we'll see how it goes."

How common are corporate plans for the use of microcomputers?

Richardson: They're starting, but just barely. The awareness levels have been raised enough that people are less concerned about "standardization" and more about optimum use of resources.

Our basic posture is to put technology in the hands of our people rather than just saying they are going to use an ABC or an XYZ with the following four packages. Most organizations are not at the stage of deciding they are ready to begin with an interface through IMS or whatever else the case may be.

Instead, they're saying that the data they need to make a decision today may clearly not be the same data they need tomorrow — let alone the format or the periodicity of the data.

We have two big issues. One is on the user side: knowing what's there and how they get at it. The other is on the designer's side, and it's combating a mindset of building a fairly static system when in this case an open architecture system is needed.

Zachmann: What ultimately is necessary is to examine the nature of information flows in the organization. Where does information enter the system? How does it move through it? What happens to it? Where is it stored? Where do you eventually get rid of it? Until you establish those flows, the probability of having any real integrated plan for developing this kind of corporate nervous system is very low, and the solutions will always be partial.

Complex organizations have to be organized by design, plan or idea from the top down. They don't happen accidentally.

McQuillan: In other words, organizations have to take the evolutionary approach, not the system design approach of bringing in a few things here and there and hoping some will hit.

Zachmann: Too often personal computers are thrown into an organization with the hope they will make it evolve into a healthy organization.

Those who manage the OA transition effectively will be the winners in the future; others will just die.

Richardson: We also haven't focused enough on what the organizational impacts are going to be. Will jobs be enriched or displaced? Will middle managers dwindle away like the minicomputer when top executives have technical facilities for information now provided by middle managers?

What effect do you think the technologies are going to have on OA in the next five years? What are they going to do for the user in the corporate environment?

Richardson: I can't predict, but I can say what I'd like to have happen. I'd like to be able to pass information — regardless of what it is — to wherever I want. I don't want to be restricted by transforming a thought into textual symbols in a word processor and then passing those textual symbols over a data PBX digital switch.

If the communication happens to be visual, then I want to send it visually. If it's oral, I want to send it orally. I want to see architectures like Vision and Lisa and all the rest that are the beginnings of the intuitive interface reach the level of communication where we don't have to depend on traditional forms of data conversion and passing and unconverting bridges and so forth.

Zachmann: First, I think personal computers and what they evolve into will become the office workstations, more and more replacing dedicated terminals or word processors or other specialized hardware.

Second, networking will take off over the next five years.

Third, the mainframe processors of today will start to move toward specialized data base servers or high-speed computational servers probably with relational data base software. This software will be hardware-assisted, so that basic operations that are inherently difficult to do on a standard architecture can be handled by distributed data base machines.

We're talking about three basic areas. The first is the workstation and the interface with the personal computer, with better and better software.

The second is the communications backbone — baseband technologies for work area networks and broadband technologies for local true area networks.

The third is on the side of basic large corporate data management: evolved mainframes and data base machines with relational data base capabilitiea supported by hardware. These will provide much easier to use large data base engines that will start to solve the problem of access into the large data base.

McQuillan: Obviously, I agree with some things Rick and Will are saying. In five years we'll see personal workstations that can support considerable artificial intelligence. In the next year or two we should see this support on mainframe operating systems and mainframe applications. So the breakthrough of expert base systems will occur.

Another significant area will be in value-added services available on a public basis. I think deregulation is going to make a significant difference. The local operating companies are going to be offering voice mail, protocol conversion and digital PBX.

I think we will see more progress for OA intercompany than intracompany.

Zachmann: Another likely change will be in the ability to assess the difference between good performance and poor performance, particularly on the part of professionals and managers. I think they are the people who will be most under the gun in the future.

The biggest opportunities exist for those who are capable of performing well and taking advantage of the new opportunities the technology provides. But these same people could also be the biggest losers. This will happen where the biggest organizational resistance is directed toward middle- to upper-level managers and professionals who, in fact, exist in a fairly comfortable cocoon of ineffective information systems. When these managers achieve a certain level of seniority and status, the question of whether they are doing a good job or not is unanswerable for most other people in the organization. A number of middle and upper management nonperformers risk being exposed by a better information system. That is precisely where the biggest "people" impact will enter.

Richardson: How are we going to pay for all this?

Downstream, somehow, this stuff has to begin to make economic sense.

> ***"In the early mainframe days, we heard that these systems would reduce the number of people necessary. They didn't; they did nothing but increase the number of people we have. But they did make us more competitive and, as our competitors automated, we were forced to get better automation."***

McQuillan: Let me throw out a slightly different answer — I think some people have a terrific opportunity on their horizon. These are the folks who right now are narrowly defined as trainers, but who helped facilitate, explain, train and motivate the use of all this technology. The sky is the limit for them because an endless series of new things are coming down the road. These things need to be explained and put into context for the people who will then go ahead and use them.

Zachmann: Personally, I find building an office of the future to be an utterly irrelevant business aim. The only reason for investing in any of this technology is that it lets you run a business better, do your job better or be more effective. Maybe it makes you able to survive more competitively.

That's why an organization ought to analyze the ways it is going to pay for that information architecture. There are clear and demonstrable costs to slow-moving information. People haven't seen the bottom line yet; until they do, they would be fools if they spent lots of money chasing technology for its own sake.

I spend most of my time looking at technology, but I would be the last person to advocate it as a thing in itself. It is only relevant if it does something for you — if it lets you do something better.

Richardson: I think the three of us would agree that some portion of whatever we implement is clearly going to make us more efficient and effective contributors to organizational and individual productivity.

However, that change may not always be measurable. It becomes a presupposed requisite for work. Management may well have to focus on the fact that there is just going to be that technology on the desk. The only way we can effectively and adequately compete for personnel is to put in a system.

Will this be an automatic evolutionary attitudinal change? Or will it take a certain amount of training of executives before they realize you can't put everything on a balance sheet?

Zachmann: Managers should not accept the inevitability of technological change. I personally don't buy the argument that automation is going to be there, so you just have to have it. Maybe that will be the case, but an organization should analyze the benefits of automation and implement it because of those benefits. This implementation should not be based upon some fuzzy or will-o'-the-wisp or "gee-whiz" technology. Gee-whiz technology in and of itself is not the basis for a good business decision.

McQuillan: I don't agree, Will. First of all, I've looked at a lot of cost-justifications, as I'm sure you have, too. Probably 80% of them are pure bunk. Most cost-justification in this business is really just a lot of garbage.

I agree with you that it is important to try to show cost-justification, but the fact of the matter is many people don't do it well. And is it necessarily a disadvantage if there is no strong cost-justification? I've looked at a lot of electronic mail systems that are cost-justified and I've come to the conclusion that cost-justifying an electronic mail system in advance is the kiss of death!

I know a number of organizations that have very carefully figured out where electronic mail would be cheaper than other systems, and they've tried to make it happen in their area. And it has happened — in that area and nowhere else. Contrast that situation with one where people have brought in electronic mail and said, "We will have a survival of the fittest. It will replace telex, telephone and letter in our organization." Price, speed or effectiveness — whatever it is, people will go with it, either consciously or unconsciously.

In other words, let the cost-justification happen in the real world over a six-month or one-year period. And then you'll find considerable success with electronic mail. A firm may still may end up spending more money than it used to, but if it has become more efficient and effective, maybe it's worth it. Plan, yes — cost-justify, no.

Richardson: We can't ignore the fact that the availability of technologies raises the level of expectation of those we hire and those who work for us. In the early mainframe days, we heard that these systems would reduce the number of people necessary. They didn't; they did nothing but increase the number of people we have. But they did make us more competitive, and as our competitors automated, we were forced to get better automation.

You couldn't give someone an office space today without a telephone — it just wouldn't make any sense. Yet, management is still not attuned to a situation where, although nothing may change in the next year, a long-term trend is in process. Soon, in addition to cafeteria benefits, employees will be looking for specific things in the form of technology. It may be a cost of doing business and maybe we need to begin strategically planning to pay for it even if it doesn't pay for itself.

I don't think management has yet realized that this access to information they're seeking will change the fabric of their company. OA

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Apple Tries To Pull Together An Office Strategy

By Glenn Rifkin

Not long ago, the future of Apple Computer, Inc. was as sunny as the skies above its sprawling Silicon Valley headquarters. The six-year-old personal computer maker had achieved legendary status as the fastest growing company in U.S. corporate history. Apple, its admirers said, had singlehandedly created the personal computer industry and had managed to stay at the top of that industry by pushing a solid product (the Apple II) and a unique image.

By the beginning of this year, however, there were clear signs that all was not well with the innovative company. Needing new leadership and direction, Apple enticed John Sculley to leave Pepsi Cola and become president. Sculley immediately set out to reorganize and redirect the company. He brought in William Campbell from Kodak Corp. to centralize the company's floundering marketing operations and consolidated Apple's manufacturing sites. He also halted Apple's in-house production of disk drives, deciding it was cheaper to buy the product.

The internal rumblings and disappointing sales of Apple's heralded Lisa resulted in a fall in the company's stock, which reportedly had made millionaires of some 300 employees. From a high of 65 the stock fell to 20, and earnings were seriously down — they nosedived 73% in the fourth quarter. Though it was a gloomy summer and fall in Cupertino, Calif., the morale among the company's 4,700 employees remained strong.

With 1984 just around the corner, Apple has gone on the offensive to create an image as a multiproduct, multichannel company. The new strategy is a response to the industry realities that caused Apple to stumble during 1983. As the new year approaches, Apple faces a laundry list of question marks that industry analysts feel must be properly addressed for the company to survive. Among those questions is the following: Can Apple create a name for itself in the office?

Although the company admits it is not in a position to become a major office automation vendor, Apple realizes its personal computers have already made it onto thousands of desks in offices around the country. The company is convinced that, in its Lisa personal computer, it has a technology that will make its presence felt in both large and small office settings. As Barry Smith, product marketing manager for personal office systems, put it, "Lisa will be our flagship product in the office. It is a new foundation for the personal computer industry. It will force the industry in a major new direction."

Of course, Apple was trumpeting Lisa's praises in January 1983 when the product was first announced. Unfortunately for Apple,

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the response didn't match the excitement. Although industry watchers praised the power and elegance of the 32-bit 68000 microprocessor and were suitably impressed by the friendly mouse and innovative graphics package, the buying public simply wasn't ready to open its pocketbook for a $10,000 machine. Criticism mounted as the interminable five-month wait crawled by before the product shipped.

Besides the high price, critics pointed out, Lisa wasn't compatible with anything, including other Apple products. Also, four of its six bundled software applications were said to be mediocre; Lisadraw and Lisaproject, while impressive, didn't do many people much good.

"What they tried to do is sell Lisa as an integrated, turnkey system like the Xerox Star. The Star was a ludicrous failure, and why Apple thought it could succeed where Xerox failed still puzzles me," said Michael Hammer, president of Hammer & Assoc. consulting firm.

Apple has heard all of the criticism and has responded by dropping Lisa's price for the fully configured system to $8,190, an 18% cut. It has also unbundled Lisa; the system hardware can be purchased alone for $6,995, with the six software applications available for $195 to $395. Apple has actively encouraged third-party software development for the Lisa and feels its open architecture makes it an inviting receptacle for developers.

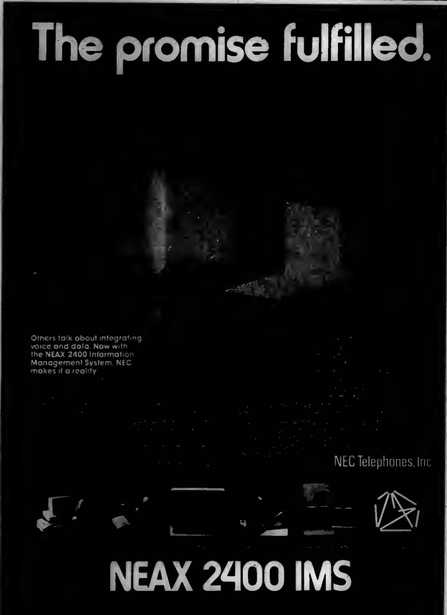
Most important, last month Apple began to ship Lisaterminal and the Apple Cluster Controller, communications packages that reportedly allow Lisa to interface with an IBM mainframe and outside data bases and to emulate the Digital Equipment Corp. VT100 and IBM 3270 terminals. Coming soon, the company has stated, is Applenet, a local-area network that will allow Apple's products to work together as a system for the first time. Smith indicated that Lisa would be compatible with other Apple products and the Unix, MS/DOS and CP/M environments in 1984.

Floyd Kvamme, executive vice-president of sales and marketing for Apple, admitted the company made a serious error in announcing Lisa five months prior to shipping. For most products in the office, he said, people want to plan in advance, but the five-month wait was too long.

Kvamme stated strongly, however, that Lisa was "not off to a bad start." He pointed out that the price reduction was not in response to criticism, but was merely following up on what Apple had promised in February. The company said it would set the price and unbundle the software once Lisa was in production.

"We probably allowed the hype to get too big," Kvamme acknowledged. "There was not a chance we were going to ship 30,000 Lisas. We've shipped between five and 10,000 since June. Is that a bad start? We don't think so."

The start, however, is not the key. Where Apple finishes in the office race is what concerns the company now. The Apple IIe, one of the industry's best sellers, will remain targeted to the home and education market. The Apple III has had disappointing sales and is reportedly going to be repositioned for vertical markets through OEMs. According to Smith, Apple realizes the Apple IIs and IIes that are in the office generally came in "through the back door" — brought in by individuals who had seen Apples at home or elsewhere. Lisa will have to come into the office through the front door, Smith said, but it will be possible to get the Lisa on the approved personal computer list of companies if users can see the machine.



Others talk about integrating voice and data. Now with the NEAX 2400 Information Management System, NEC makes it a reality.

'We probably allowed the hype to get too big, [but] we've shipped between 5,000 and 10,000 Lisas since June. Is that a bad start? We don't think so.'

Floyd Kvamme of Apple Computer, Inc.

Gaining access to the office will not be easy. According to industry analysts, Apple is not perceived as an office vendor and must have an organized communications strategy for its products even to be considered. Tim Caffrey, analyst at International Data Corp. (IDC), pointed out that the personal computers in the office have moved beyond the market Apple established three years ago. Management information systems (MIS) departments are more sophisticated now about personal computers and are demanding communications. Hammer added that the recent announcements by IBM and Digital Equipment Corp. (the IBM PC XT/370 and the DEC Microvax — see Page 6) will make it even tougher for a product like Lisa to be taken seriously.

"If I were a software developer, I wouldn't waste time thinking about Lisa. Events move so quickly in this industry that Lisa is already history," Hammer said.

Apple, which invested four years and more than $50 million in Lisa's development, is not about to give up that easily. In fact, Lisa's 68000 microprocessor and its facile mouse will form the basis for future Apple offerings, including the much-talked-about Macintosh. Kvamme said Apple's entire product line would have mouse interfaces in 1984.

What Apple is banking on is that if a potential buyer gets a chance to use the Lisa, it will sell itself. "We can't outmarket IBM, so we had to come up with a better product. We've got to tell the world that to buy a personal computer without seeing an Apple is a mistake," Kvamme stated." To this end, Apple has stepped up its national advertising (to the tune of $50 million) and has boosted its licensed dealers to 1,650 (dealers licensed to sell Lisas number 150, with a target of 500). "We hope that the advertising makes people aware of Apple and that the ease of use will make people push for the products," he said. "By getting a few to think that way and then a few more, we will sell our products. You don't broadside into the office."

Apple has carefully considered its options in the office. It has targeted both the market and the individuals within that market for its products. Unable to offer a systems solution like the IBMs, DECs and Wangs, Apple is looking to the individual professionals and managers in the office who have a variety of applications needs from their workstation. That knowledge worker, Smith pointed out, must not only do analysis, but must be able to communicate that analysis as well.

The combination of Lisa's innovative graphics capabilities along with the communications potential of Lisaterminal and the Apple Cluster Controller will make Lisa a very attractive tool for that line of worker, according to Smith.

The key advantage of Lisa, Kvamme added, consists of its strengths as a personal productivity tool. The fact that a user can be up and running on a Lisa in about 20 minutes and can effectively use its integrated software without complicated switchovers make Lisa worth its asking price, he said. Kvamme also stressed that Apple products are designed to allow end users to be the first line of service and support. "Lisa is a strong tool if it is put in the right place," said Rick Wohleber, manager of systems development for Rockwell International in Dallas. "On the right desk, the price can rapidly be recovered."

Unfortunately for Apple, first impressions are difficult to change. Caffrey of IDC said that the Lisa, even at $7,000 for the hardware, is still "a lot of money. It's going to be a matter of convincing people that the capabilities are really necessary. In a way, the Lisa packs too much power."

Smith said that although Lisa might seem high-priced to the home user, the OA manager views the price range for a professional workstation to be in the $10,000 to $15,000 range, and Lisa comes in on the low end of that.

Apple has also taken a pragmatic stance toward its target market. Though it would welcome business from the Fortune 500 companies, Apple is looking toward the mid-size to small organizations for a more receptive audience for its pitch. Smith explained that Fortune 2000 companies make up merely 30% of the market, and Apple would concentrate on the other 70%. "There is less of a commitment to IBM in the smaller companies; in places that do less than $5 million in revenues, MIS doesn't even exist. Since we are dealer-based, this is a more receptive market for us."

Hammer, however, is pessimistic about Apple's chances as an OA vendor in either large or small companies. "My clients aren't interested in Apple at all, and the smaller market is still uncertain. The key there is the distribution channel. Places like Businessland are the wave of the future for small businesses and the question is whether Apple will be the system of preference in those places."

For Apple to succeed on a widespread basis in the office, industry watchers believe, getting the chief executive officer to play with a Lisa is simply not enough. The DP or OA manager who brings in the systems must be the moving force behind Apple's entry.

Kvamme pointed out that if the MIS manager is the type who "tells the user what he wants" Apple could easily be locked out. But if that manager is concerned with servicing end-user needs and if there is end-user involvement in the decision making, Apple can be a major force. "DP managers are the prime vendors of systems to their companies," Kvamme said. "If a DP manager services user needs and recognizes that not everyone wants to be a technical authority, we have a good shot."

Patty Seybold, editor in chief of the Seybold Report, said Apple could get around the MIS manager if it plays up the right audience. The personal computer surge was a grass-roots phenomenon and if users stampede in the direction of Lisa, MIS will likely go along with it, she said. Seybold is skeptical of that happening: "IBM is starting to play its PC cards and the pace is increasing. It will be harder for Apple to stay afloat. Lisa technology, if not Lisa itself, might get them into the office, but Lisa users tend to be more esoteric folks — people playing with graphics. The active business person has no time to play with those things. Lisa may end up as an important OEM product."

The keys to holding off IBM for Apple are its data communications capabilities and the availability of software for the Lisa. Both areas are receiving top priority from Apple. Making good on its promise to unbundle Lisa and present opportunities for third-party software development, Apple has announced two development products, Quickport and Lisaport. According to Bruce Blumberg, manager of third-party products and development tools, Quickport provides a simple way to integrate existing applications into Lisa's world, while Lisaport is designed to create Lisa-like applications. More than 155 developers reportedly have Lisas and are at work on software.

Russell B. Aldrich, manager of Apple's MIS/Advanced Products programs, explained that Applenet, the long-awaited local-area network being developed along with Cullinet Software, Inc., had been put on hold. Originally designed as an Ethernet-based proprietary network, Apple took a step back when "it appeared Ethernet would not be the answer." Cullinet and Apple have parted ways on the deal, saying only that "the project was bigger than we both thought it would be."

Apple will modify its plans when IBM announces its network, Aldrich said. A new direction, based on a private branch exchange rather than cable-type design will be implemented. "We're not going to be the supplier of large corporate networks, so we're trying to make the connection without adding cable. We listened to our customers and their biggest fear is running more cable. The holdup hasn't set us back very far. The network should be announced and ready to go in the first or second quarter of '84," he said.

It is clear that 1984 will be a critical year for Apple. The Macintosh, reportedly a Unix-based, more constrained and less expensive version of Lisa, is expected to have a major impact on the company's future. Steven Jobs himself, Apple's 28-year old cofounder, is heading up the Macintosh effort. Apple's other founder, Stephen Wozniak, has returned to the company after a two-year hiatus; his return is said to bespeak the seriousness with which Apple views its current situation.

With IBM unwrapping its big guns, industry analysts remain skeptical of Apple's chances in the office. As Caffrey of IDC declared, "They have their work cut out for them." OA

Rifkin is staff writer for Computerworld OA.

Don't Be Fooled By PC Buying Myths

By Richard Strauss

Seeking help with the myriad tasks threatening to drown him, a businessman enters a computer store. He emerges an hour later, a bemused expression on his face, a collection of computer magazines under his arm and a flock of esoteric computer terms circling his brain. Instead of finding the help he sought, he is wondering where he will ever get time to learn enough about computers to define what he needs. Inside the store, the salesman is satisfied that he has started another potential customer down the road of self-education in the arcane art of selecting and using a computer.

Actually, the salesman trapped the businessman in one of the most common computer myths, the idea that the customer must be able to define his needs in computer terms before he can select the machine he wants. The businessman will now spend months educating himself, using time he could more profitably have devoted to his business or family. In the end, he may be hopelessly confused. If he does pick his way through the technical terms, he may weigh himself down with equipment that may or may not actually help him. He has not saved time — he has acquired a new and unwanted hobby.

A number of myths surround the purchase of a personal computer, and buyers need to be aware of them. For example:

1 ***You have no business buying a personal computer if you don't know the difference between a byte and a bit or a floppy and a Winchester and if you can't specify how many bits and bytes you want on them.***

Every day, salespeople convince small computer customers that something is wrong with them because they do not know computer terminology. The problem actually lies not with the customer, but with the computer industry. Purchasing a computer should not be any more complex than buying a car. When you go to the automobile showroom, the salesman doesn't demand that you talk about compression ratios, gearing and other esoteric subjects. Instead, you discuss your transportation needs. After these are defined, you try out the car to see if it feels right and does what you want it to do.

The computer salesman should do the same thing. Instead of talking about bits and bytes or floppies and Winchesters, he should help define needs in the customer's terms, then guide him to combinations of computer equipment and programs that will meet those needs. Dealing with technical terms should be the salesman's job, not the customer's. This is most applicable to the one-person/one-machine situation. If multiple units are being bought to fit into an organization's overall system, the situation becomes more complicated.

2 ***You must read large numbers of assorted computer magazines before you will begin to know what you want.***

Computer magazines are informative: They can help the potential first-time purchaser understand what his computer can and cannot do, and they can suggest new, cost-effective applications to those who already own computers. However, such magazines can also draw the purchaser's attention away from what he wants to do with the computer.

The first-time user should find a publication that offers an appropriate comfort level. Available choices include general computer magazines and a number of specialized publications that cover the use of computers in specific businesses.

3 ***The higher the price, the better the machine.***

Attempting to learn computer terminology is not the only possible trap awaiting the potential purchaser of a desktop computer. Just as harmful

Purchasing a computer won't be so hard if you remember that your application needs should determine what you select. And . . . if you don't believe everything you hear.

is the idea that higher price necessarily means better quality. New and more powerful personal computers are being developed constantly. As each comes on the market, older models are labeled outmoded and their prices are cut. The microcomputer that sold for $5,000 two years ago costs $2,000 or less today, but newer machines are selling for the same $5,000 and are commonly regarded as inherently better because they have more computer "power."

Actually, they may not be better. Sometimes the higher price is based simply on what the market will bear, and the lower priced alternative will do the same job equally well. Furthermore, a machine that is better in absolute terms may not actually offer a particular purchaser any real advantage over a lower priced and less capable model. Computers come in all prices and sizes. The model that handled a task efficiently last year is not necessarily outmoded just because a newer machine is now available. If the task is the same, the old machine can do it just as well this year and may be the most cost-effective choice.

Software is another major concern. Often, small computers appear on the market with practically no available programs. If a buyer selects one of these he may have the latest in hardware, but he will not be able to do much with it until the software for his word processing, bookkeeping and other needs becomes available. A $5,000 paperweight is no bargain.

4 Wait to buy a personal computer because, with prices going down, you will get more for your money by waiting.

This is the opposite of the "more-expensive-is-better" approach. Because computer prices are dropping, the buyer is always better off waiting a few months for a better deal, according to this myth.

The three-decade drop in the price of computer power is one of the most spectacular events in the post-war economy. In spite of often horrendous inflation rates and generally top pay on all levels of the computer industry, the headlong development of new electronics technologies has caused computer prices to fall precipitously — and the end is not in sight. Eniac, the first true electronic computer, cost millions of dollars in 1946. Today, more powerful machines are being sold for less than $2,000 in retail stores. Tomorrow, the price may be down to $500.

Against this background, it is often tempting to put off a computer purchase. A year from now, that machine and its peripherals and programs will all cost much less; the money itself will be worth less. If the purchsse is barely cost-justified today, it will be a bargain in a year.

Such a belief is based on a failure to look at the company's needs. If the computer is cost-justifiable and time-justifiable today, it will save the company more money than it will cost. If the purchase is put off a year to save $3,000 in purchase price, but the company loses $50,000 in efficiency for lack of that computer in that year, the net result is a loss, not a small saving. Also, the user will be that much further behind in expertise on the computer and will still be doing his job the "old-fashioned" way, while his competitors are already using a computer.

5 You need to find specific packages for your precise needs.

Because general software won't satisfy these

needs, you should buy the personal computer that offers the most software.

Having heard this myth, the computer purchaser tries to find software that fits his needs precisely in order to use his computer effectively. This attempt leads the purchaser to believe that the computer with the most software available is the best choice. It also often leads him back to the myth that he must thoroughly educate himself on computers — or at least software — before he can buy anything.

In fact, most business needs may be effectively met with general, off-the-shelf software available for all business microcomputers. The same WP program can be used effectively for composing letters and business reports. The same electronic spreadsheet can handle the bookkeeping needs of a variety of businesses. Even if a particular program does not meet your needs precisely, it may add so much efficiency to your operation that it will still be of great value. The relevant question, therefore, is not what computer has the most software available, but what computer can most cost-effectively fill your needs.

Choosing a system is a three-step process. The first and most important step is carefully defining your present and future needs. This is the basis of effective computer purchase and it is the one step you must do yourself. You should define your needs in business terms, not in computer language.

After you have defined these needs, you can begin the second step — working with computer sales people to determine what software fills those needs.

The third and final step is selecting the computer hardware that, at the least cost, most adequately runs this software. The selection may be the latest machine on the market or a dependable older design. It may have many extras or it may have few. The important thing is that it will do the job at less cost and with maximum efficiency.

One effective way to define your needs is to answer a list of questions based on the capabilities of the small professional computer. A general list cannot cover all special needs, but it can help you to decide what basic uses you may or may not have for a microcomputer.

- Are you keyboard literate?

If you refuse to use a keyboard, you will have no personal use for WP — although your secretary may find it invaluable. You may want to use a touchscreen system that allows you to order the computer to complete selected functions or to find certain information hy touching the correct order on the screen.

On the other hand, if you type well and prefer to compose your own letters and reports, you might find WP alone will justify the cost of your desktop computer. Any good WP package will double to triple the speed of composition and editing and will produce a better looking, error-free final draft.

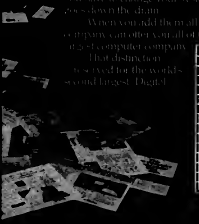
- Would you like to prepare your own presentation? If so, would you like to make your own graphs and illustrations?

If you enjoy these activities, you will want a graphics package to create the kind of graphs you like from data you feed into your computer. If you also want to draw pictures, you will need a more advanced package.

- On what media do you want your graphs and illustrations to be presented?

Different computer peripherals will allow recording on 35mm film, transparencies or printed on paper.

- Where will the data



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and text for your presentations come from? Who would you like to review and edit your pieces? If you are taking your information from a central mainframe, it makes sense to connect your desktop machine to it with a network. This setup will allow you to get what you need on demand without having to reenter data at your desk.

If you want your boss to read the drafts you prepare, it may be more efficient to network your desktop machine to his and send the drafts directly from one computer to the other.

- Do you prefer to dictate your drafts or editing changes or to write them on the keybard? When you review a draft, would you like to hear your dictation while you read the typed text?

If you answer yes to these questions, you may want to consider a voice digitizer, which allows the computer to record and replay voice messages. For example, a voice digitizer can be used to edit copy on screen, using a program that marks a piece of text to be changed automatically when you dictate the change. When your secretary goes through the text afterwards, the digitizer plays back your comments as each marked passage is reached.

- Do you do a lot of comparisons of figures — experimental, budgetary, statistical or financial? Where do these numbers come from?

If you do much work with figures, you will want either an electronic spreadsheet that allows you to set up your own system or some sort of specialized software package to run the comparisons for you. If your figures come from a central computer, networking your machine to it will greatly increase your efficiency. If you use financial models constantly, you will probably want a specialized financial modeling program.

- Do you use the phone often, and do you play telephone tag? Are you flooded with message slips? Would you like to prioritize phone calls?

One way to get rid of telephone tag is electronic mail, which allows you to send written messages either directly to the other person's computer or to a central storage data base. The central storage allows you to avoid constant telephone calls by storing messages for the recipient to receive when he is available. This setup also overcomes the problem of conflicting time zones.

Another way to avoid the flood of message slips is voice digitization connected to the telephone lines. With this system, the computer can record incoming messages and prioritize them for you, avoiding paper message slips.

- Do you keep tickler files, or do you wish you kept them?

Computerizing a tickler file system removes the drudgery from the task and ensures that nothing is lost or overlooked.

- Do you wish you had access to timely information like airplane schedules or stock and bond prices?

After you have defined your needs, the best way to know if a particular personal computer will meet them is to try it.

If so you may want to subscribe to a data base management program to keep and automatically cross-reference those files.

- Do you solve complex formulas on a calculator?

If all you do is add and subtract, a hand calculator is your best answer. If you need to handle complex mathematical functions, a calculator program for your computer may be a great aid.

Other questions to ask are how important are the time-zone problems in communicating; do you know what a financial model is, and do you use them; and do you keep a set of your own personal files of information.

After you have defined your needs, the best way to know if a particular personal computer will meet them is to try it. Computer manufacturers should be able to demonstrate how their equipment can solve your problems. In addition, their retailers have excellent demonstration systems and services. The situation will vary according to your needs, but they may offer to let you try the system in your office. These special efforts by manufacturers and retailers mean they are serious about helping to solve your business problems — not just about selling you a computer. **OA**

Strauss is marketing manager of the Personal Computer Group at Digital Equipment Corp., Maynard, Mass.

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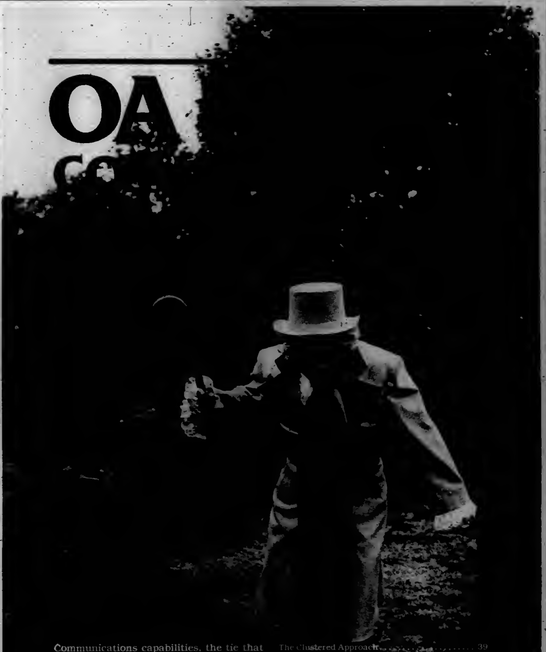

Communications capabilities, the tie that binds office automation together, began to develop and diversify at rapid-fire speed in 1983, and this trend will continue through the next few years. Determining the best communications technologies for your organization will be critical for the growth of your computing environment — frequently, even for your firm's business plan. This OA Focus highlights some developing technologies and some new ways to use others that are already familiar.

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Yesterday's Menu, Tomorrow's Feast 69

Computerworld OA expresses its appreciation to Kevin Donahue and the Boston Guild for the Hard of Hearing for lending us the hearing trumpet that Ebenezer Scrooge uses in our cover photo. First manufactured in 1875, the trumpet was an earl forerunner of today's hearing aid

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BUILDING MICRO NETS

THE CLUSTERED APPROACH

By Aaron Goldberg

One of the first peripherals to be attached to the personal computer after floppy disk drives and printers was the modem. This device opened a completely new range of computing vistas for the personal computer user. Although the low-speed modems of the late '70s are now a thing of the past, the emphasis and planning needs for personal computers have grown exponentially, culminating in the personal computer/3270 clustered workstation.

Management information systems (MIS) planners must comprehend and examine a number of separate issues when planning for personal computer use as part of a com-

municating, coherent network.

The most important of these factors are the following:

- Standardization of personal computers.
- Data security and integrity.
- Examining the communications type and environment.
- User interfaces and training.
- Identifying applications.

In the following analysis, we will examine each of these sections in detail and provide information on the present level of development and the likely migration within the next 12 months.

One key consideration in setting up a useful communications network of personal computers is ensuring that the personal computers used in the organization are not so diverse that they make interconnection impossible.

If the brand selection process is not limited in some way, totally integrated communications may at best be a dream.

This may seem to be an elementary point, but it is of primary importance. If the base of devices to be interconnected is too diverse, other planning efforts will be in vain. In most organizations, significant ad hoc purchases of personal computers have been made and continue to be made.

If the brand selection process is not limited in some way, totally integrated communications may at best be a dream.

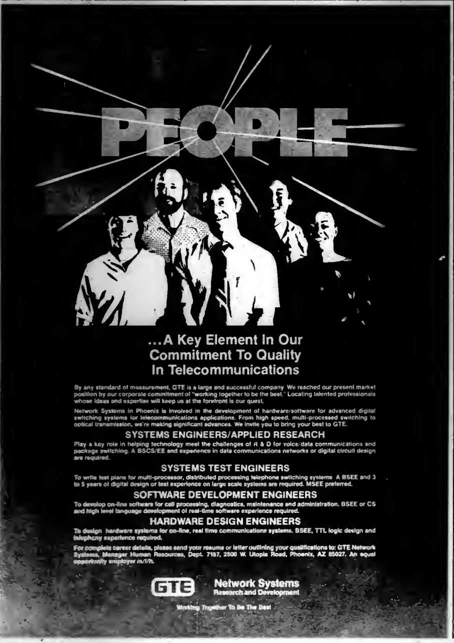
Although no single philosophy of controlling personal computer purchases will work across all organizations, a number of different methods of approaching the situation will provide the desired results. One useful approach has been proactive planning, a generic factor in approaching the brand selection process for personal computers.

In proactive planning, potential users are identified and contacted prior to the beginning of their decision-making process. Proactive planning can also allow the MIS organization the luxury of true planning rather than reacting to the situation.

Even with the so-called "all-connective" networks, problems will occur. These problems will mainly involve less popular equipment, which the manufacturer's or third party's specific network interface was not built to handle.

Security is the largest fundamental operational problem in the use of personal computers with mainframe data and access. There are numerous worries concerning obsolete data, theft of data and access to confidential data. Each of these concerns is magnified as the number of on-line users with some access to the system increases.

Many MIS organizations with dynamic data bases are concerned that decisions are being based on data that has changed in some proportion since it was downloaded from the host data base. It is usually difficult to fix blame for this problem. In many cases, users are unaware that the data is updated as frequently as it is. In other instances, the data may be subject to wide cyclical fluctuations; taking a



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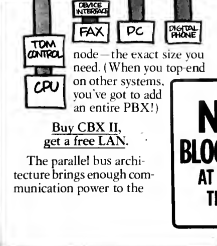

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AT ANY
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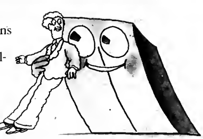
Then there's Cypress,™ the ROLM personal communications terminal that combines a full-feature digital phone with a full-size, smart ASCII terminal.



Slide the keyboard in and you're looking at the slickest, easiest-to-use executive phone in the business.

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You can pre-store log-on sequences and terminal profiles, so there is no changing baud rates or other parameters each time you call a different information source.

More devices, more applications, and more network capabilities than anybody.

CBX II can not only support devices like the new ROLMphones and Cypress, it supports everything from analog phones to IBM PCs.

Applications include PhoneMail,™ Call Management Reporting, Automatic Call Distribution and non-ROLM application-processors like IBM host and minicomputers.

CBX II can even network networks. Everything from public switched networks to packet data networks. From WATS to X.25, IBM Infonet and AT&T's Net 1000. If it's private networks, we give you the whole range. From our own ROLMNET™ to TI/D3, fiber optics, X.25 and satellite.

We're leaving our competition behind, not our customers.

CBX II is just the latest reason why ROLM systems are the choice of two-thirds of the top *Fortune* companies, and the preferred solution to digital networking. More than 13,000 ROLM CBX systems are up and running today. And every one of those systems can be easily and cost-effectively upgraded to CBX II capabilities.

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A non-blocking, totally digital, absolutely expandable centerpiece for the ROLM Business Communications System.

Take The Ramp.

Your people and your data devices will never be prevented from calling their favorite person or computer on a ROLM system. There are always more communication channels than users. Even our 10,000-user system has more than 10,000 channels. That capacity—with our giant bandwidth—makes blocking impossible.

Don't put all your processors in one node.

In monolithic architectures, the entire system is susceptible to CPU failure. Wham! The whole place goes dark. Phones. Computers. The works.

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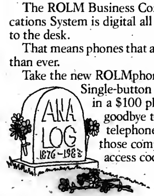
Friendlier computers. Smarter phones.

The ROLM Business Communications System is digital all the way to the desk.

That means phones that are smarter than ever.

Take the new ROLMphone® 120. Single-button commands in a $100 phone! Say goodbye to analog telephones with those complicated access codes.



Or the ROLMphone 240—more feature buttons, multiple lines, and a built-in, hands-free speakerphone.

Or the ROLMphone 400 with even more lines and feature buttons—plus a sixty-character display, a speakerphone, auto-dialer, built-in call-costing system and much more.

Thanks to our 256Kbps ROLMlink™ you can talk on the ROLMphone and use your terminal or personal computer at the same time. Over the same pair of wires.

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"snapshot" of any period in time will be misleading.

The theft of data in a machine-readable format has long been a problem for the MIS organization. In the past, the worries were relegated to the data center itself and to those who would be able to take a computer tape from the facility. With personal computer access and the ability to store a megabyte or more on a floppy diskette, however, more leaks in the organization can occur.

Because of the remote and relatively unsupervised operation of the personal computers, there is greater belief that theft can and will occur.

The one area in which the MIS organization has the greatest opportunity to prevent concern is that of unauthorized access to confidential data. It is unlikely that a data base that has been secure against past intrusion will be intruded upon by the mere presence of personal computers. Problems can occur, however, when coworkers exchange passwords for certain applications. This practice can be especially dangerous if supervisory personnel allow their passwords to be known. Education of new users should be mandatory when they are allowed mainframe access.

As stated earlier, the 3270 will be a major method of communication between mainframes and personal computers. Whether it is the best alternative has yet to be proven. Understanding the personal computer user's present communications needs helps to shed light on this question.

Most of today's personal computer users' applications tend to be stand-alone. Host communications becomes necessary to download files and other information in a batch mode.

Because very few corporate users are presently in a highly interactive environment, the 3270 may not be the ideal communications medium for the personal computer user organization in a large organization. Local-area or work-area networks with a 3270 or Systems Network Architecture gateway may well be the best solution to this problem.

Research into local-area network use tends to support this theory. In most cases, the local-area network supports fewer than 10 users, and they all share some information. In the large organization, an environment in which 10 users share the network and gateway could lead to efficiencies in the use of 3270 lines and could allow the MIS group to extend some control over the data that resides on the network disk.

Because of the remote and relatively unsupervised operation of the personal computers there is greater belief that theft can and will occur.

The thought that personal computer users should have the equivalent of an Irma board (Technical Analysis Corp.'s coaxial cable link between Personal Computers and 3270 networks) highlights the fact that the personal computer users all have the wrong device — a 3278 or 3178 might have been a better choice.

An additional argument for providing the 3270 capability as an unseen background task to the user is the training required to make all personal computer users conversant in 3270 syntax. The mere thought of training 500 non-DP personnel in this environment is frightening.

The problem of designing the user interfaces and providing training in the use of communications cannot be overlooked. One major reason for buying a solution to this problem is that at many large organizations, the MIS staff does not have the time or the talent to design the personal computer user network right now. In addition, if the development project takes 18 months to complete, it will be impossible to implement the system fully because of the

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number of ad hoc networks that will exist by the time it is completed.

This is an important point. In the same ways that personal computers appeared on an ad hoc basis, personal computer networks or communications schemes will also appear. A major impetus to purchase a communications capability for personal computers, rather than have MIS design one, is that the purchased system can be implemented now.

To ensure that the personal computer communication integration scheme is well received and is put to use, applications with broad appeal to the user community must be implemented. This means categorically that the applications will be oriented toward some type of office productivity application.

To ensure that the personal computer communications integration scheme is well received and is put to use, applications with broad appeal to the user community must be implemented.

Such applications allow the user organization to achieve some measurable gains in the productivity of workers; more important, they generate among these workers not only the perception but also the fact that the personal computers are truly doing something useful.

Electronic mail is the first application many large users implement. Electronic mail solves the telephone tag problem or alleviates delays of interoffice mail. In addition, the application is generally easy to learn and has fairly simple operational demands. The positive aspects of being on the network also allow users of the communicating personal computers to generate interest among nonusers; in addition, they function to reduce the anxiety levels of those who fear personal computers in particular and all computers in general.

Personal computers are used primarily in the office environment of most large organizations; if that is understood, the particular company can develop applications suited to its office needs. Reporting systems, calendars that tie to vacation and sick day reporting and information broadcast are additional applications that have worked for some organizations. The application should be chosen according to three criteria:

- It should be used at least once daily.
- It should be an automated replacement for a manual application.
- It should have accessability to a wide user group.

In summary, large organizations with large numbers of personal computers installed will have a definite need for communication. The form of this communication for office productivity applications will be difficult to predict, but will probably use some kind of 3270 protocol for communications with the host.

The existence of the 3270 gateway is virtually assured with the renewed dependence upon the central MIS organization for keeping track of data, communications and management of computing resources. However, the existence of subnetworks of some other type of communications protocol will also be virtually assured.

For MIS organizations, the time is now for implementation of communications capability and the linking of personal computers.

There are steps that any organization must take to ensure the security of data and the coordinated use of the mainframe installation. However, if too much time is taken in providing these capabilities, users will then take network design matters into their own hands and will create the potential for chaos. **OA**

Goldberg is research manager at International Data Corp.'s Santa Clara, Calif., office.

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BLOCKING VS. NONBLOCKING

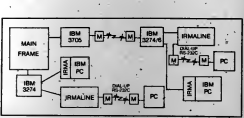
DON'T MAKE MISTAKES!

By Sally Pringle

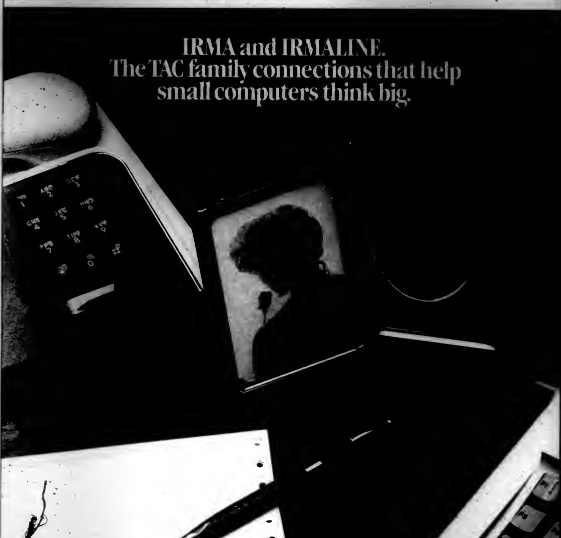
Not so very long ago, the private branch exchange was a simple telephone company-controlled electromechanical device used primarily for voice communications. Those days are far behind us now. Today's PBX is a customer-controlled digital communications system capable of transmitting simultaneous voice, data and, eventually, video signals over a standard two-pair telephone wiring network.

Office communications systems have evolved over separate but parallel paths. Voice and data systems are now converging. State-of-the-art PBX today provide a cost-effective approach to integrate the traditionally separate

Here are two beautiful ways to get small computers on line with the mainframe quickly, easily and economically—yours from TAC, home of the industry's first coaxial cable links between small computers and IBM 3270 networks.



IRMA™ is the Decision Support Interface™ that gets IBM Personal Computers and IBM PC XTs into the 3270 mainstream via direct attachment to 3274 or 3276 controllers.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technologies of voice, data and office automation into one manageable system.

Utilization of high-speed, nonblocking switch matrices allow high-speed data transmission over common telephone wiring. This is a driving force for further expanding the PBX role as a local-area network. Utilization of inexpensive and existing two-pair telephone wiring eliminates expensive conventional coaxial cable data networks and facilitates ease of expansion.

Virtually every desk is already wired for telephone and, therefore, for data service. In addition, advanced PBX technology is capable of supporting more workstations overall than any other technology at a competitive price per line while supporting a multitude of different vendors' products.

The ability of the PBX to support voice and data transmission simultaneously without degradation of service depends on whether the basic design of the switch is blocking or nonblocking.

A blocking switch physically cannot allow 100% access to all users; instead, it restricts the number of users allowed through the switch at any one time. Once all traffic paths are in use within the switch, additional users are blocked by a busy signal and not allowed on the system.

A nonblocking switch will allow all voice and data devices installed on the system to be in use at the same time. System capacity is not affected by physical connection patterns and the addition or deletion of voice or data devices will not require traffic engineering. Real-time processor capacity is sufficient to handle the maximum expected volume of voice-and-data traffic. Many interpretations

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Smartcom II communications software, currently available for IBM PC, DEC Rainbow 100, Xerox 820-II and Kaypro II.

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Smartmodem 1200B™ is also available as a plug-in board for IBM® Personal Computers. And Hayes manufactures the Micromodem IIe® for Apple® II, III, IIe and Apple Plus computers, as well. It comes packaged with Smartcom I™ communications software.

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Smartmodem 1200 for all computers with an RS-232C interface; Smartmodem 1200B plug-in board for the IBM PC.

Smartmodem Specifications
Low Speed Data Format: (Smartmodem 1200 and Smartmodem 300) Serial, binary, asynchronous, 7 or 8 data bits, 1 or 2 stop bits, odd, even or no parity (0-300 bps).
High Speed Data Format: (Smartmodem 1200) Serial, binary, asynchronous, 7 data bits, 1 or 2 stop bits, odd, even, or fixed parity or 8 data bits, 1 or 2 stop bits, no parity (1200 bps).
Dialing Capability: Touch-Tone® and rotary-dial pulse dialing.
Command Buffer: 40 characters.
Commands: (unnecessary with Smartcom II software) A: Immediate answer. A/: Repeat last command. C: Transmitter Carrier. D: Dial command, including simple dialing, waiting for second dial tone, auto-dialing and other features. E: Local echo. F: Full/half duplex. H: Switch hook. M: Audio monitor. O: On-Line. P: Pulse dialing. Q: Quiet mode. R: Reverse originate/answer mode. S: 17 "Set" commands speed, escape code character, number of rings to answer on, etc. S?: Checks operational parameters above. T: Touch-Tone dialing. V: Verbal result codes.
Result Codes: (can be numerical/verbal) 0/OK: Command line ok. 1/Connect: Carrier detected. 2/Ring: Phone is ringing. 3/No Carrier: Carrier lost or never heard. 4/Error: Error in command line. 5/Connect 1200: Carrier detected at 1200 bps. (Smartmodem 1200 only.)
Audio Monitor: Two-inch speaker with volume control.
Rear Panel: On-off switch, power jack, RS-232C connector, modular phone jack connector, volume control.
Operation: Full or half duplex.
Data Rate: 0-300 bps and 1200 bps for Smartmodem 1200; 0-300 bps for Smartmodem 300.
Interface: RS-232C.
Intelligence: Z8™ microprocessor with 4K byte control program for Smartmodem 1200; Z8 microprocessor with 2K byte control program for Smartmodem 300.
Modem Capability: Bell System 103 or 212A compatible originate or answer mode for Smartmodem 1200; Bell System 103 compatible originate or answer mode for Smartmodem 300.
Receive Sensitivity: –50dBm for Smartmodem 1200; –45dBm for Smartmodem 300.
Transmit Level: –10dBm.
Registration: FCC registered for direct-connect to the nationwide phone system. Connects with modular jacks RJ11W, RJ11C, RJ12W, RJ12C, RJ13W, RJ13C.
Power Pack: U.L. listed 120VAC, 60Hz, 13.5VAC output.
Size: 1.5" × 5.5" × 9.6"

(some of which are self-serving) exist for this relatively simple concept among PBX vendors today, and they should be clarified.

Industry controversy over whether a blocking PBX can adequately handle data in addition to voice traffic ended with AT&T's announcement of Release 2 software and hardware for the System 85. Release 2 gives customers the option to select a nonblocking matrix at additional cost.

Three configurations are now available: the original blocking mode, with a one-in-500 chance of blocking; a new "essentially nonblocking" mode, which costs 5% extra and has a one-in-a-million chance of blockage; and a new nonblocking mode, which frees time slots on approximately 4,000 ports for open connections.

Many vendors' voice switches can accommodate "add-on data" capabilities, and they claim these switches can be configured to be "virtually" or "essentially" nonblocking, as in the case of System 85's essentially nonblocking architecture. The System 85 can be installed initially with a one-in-a-million chance of blocking, but fluctuations beyond original voice or data traffic predictions can substantially alter the blocking odds at any given time. This can mean extensive ongoing traffic engineering throughout the life of the system.

To explain the predominance of blocking architectures in today's highly competitive PBX market, it is necessary to trace the evolution of the basic switch. This is normally done by generations; because of advertisers' hype, however, judgments should not be based on these indistinct categories. The term "generation" is simply a convenient way to mark major technological industry trends and changes.

All systems built prior to 1975 are considered first generation. They are voice-only and employ analog circuit-switching technology. AT&T's Dimension typifies this kind of PBX.

These switches were not designed for data and can transfer it only through modems. This, of course, does not integrate voice and data, but transmits each separately over a different path. The result is often a separate data wiring network established and maintained in addition to the voice network, at double the total network expense. Another serious problem here is that modem-controlled data transmission is expensive and limited to relatively low speeds.

Second generation refers to digital PBX systems introduced between 1975 and 1980. Representatives of this type of switch include Rolm Corp.'s CBX family and Northern Telecom, Inc.'s SL family. These switches employ computerized techniques to convert analog voice signals to digital code for digital transmission through the switch.

Although these switches were orginally designed to be voice-only, they have been modified to allow add-on data. Because voice and data are integrated at the switch rather than at the telephone, additional cabling (up to five pairs in some cases) is required between telephone and PBX to perform data switching functions.

However, for numerous reasons, data comes at great expense to these systems.

First, separate ports are required for voice and data, which degrades system size and performance.

Second, these systems come equipped with 8-bit or 16-bit processors and they were originally sized for voice-only call processing. Often these proprietary processors simply were not designed to handle combined voice and data, which can result

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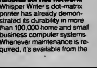

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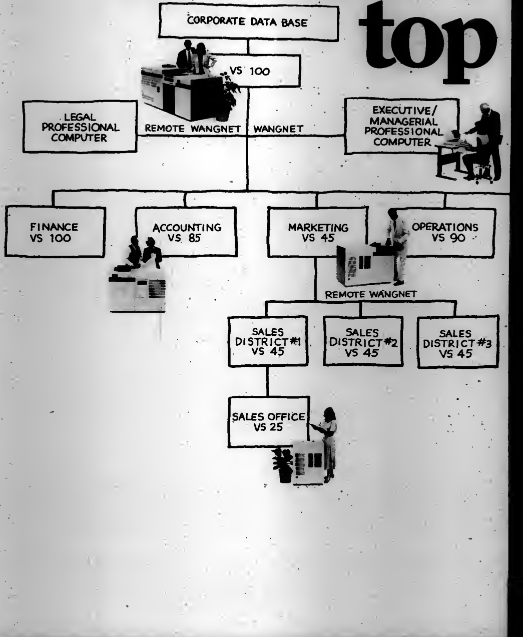

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computers compatible to bottom, bottom to top.

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in processor real-time constraints on the system.

Third, current limitations on memory size can inhibit feature implementation and performance and deter or limit software enhancements. These factors cause data traffic to have an adverse impact on the second-generation PBX.

The most pervasive argument for investing in a nonblocking PBX is that it has more flexibility to accommodate future growth and applications.

In both first and second generations, switching matrices were extremely expensive compared with today's prices. In order to control equipment costs, a trade-off was reached in product design so that a prescribed portion of PBX users could make calls simultaneously and excess users would receive a busy tone. As a result, a smaller, less expensive blocking switch could cost-effectively service a proportionately larger group of users. Contention for the switching matrix is fundamental to first-generation and second-generation PBX architecture. Although this may be adequate for a PBX intended to switch voice only, data switching can severely reduce such a matrix's throughput.

The traditional traffic analysis and engineering studies used as a basis in first-generation and second-generation switch designs were based on CCS calculations and did not make allowances for data traffic. Data requirements vary according to the user. It is difficult if not impossible to perform accurate translations of present and, more important, future usage into a voice-only-based CCS formula.

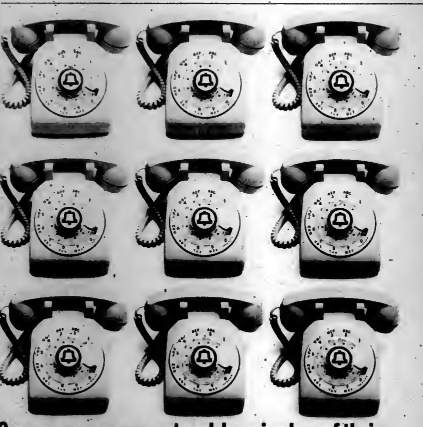
Data transmitted is of two types: short, bursty traffic (as in local-area networks) or long, conversational exchanges (as in time-sharing systems). In both cases, connect and holding times for data calls are entirely different from those for voice calls, which are traditionally estimated at 10 minutes of off-hook time per hour per telephone.

The optimum environment for blocking switches is a static one, preferably with no data traffic. Unless present and future data requirements can be predicted accurately by physical location and data traffic volume and then converted to voice traffic formulas or CCS, a blocking switch will require costly additional system-reconfigurations every time there is a shift in the volume and type of data traffic within a given system. If switch cost is based only on the initial purchase price, without taking into consideration the associated reengineering costs of moves, additions and changes, then a blocking switch may initially appear cheaper.

The most pervasive argument for investing in a nonblocking PBX is that it has more flexibility to accommodate future growth and applications. This is extremely important as dependance on data continues to increase. A truly nonblocking system eliminates expensive initial and ongoing traffic balancing and allows the movement, addition or change of devices without reengineering the entire system. This fact alone will also help guard against premature obsolescence.

At this point, a nonblocking architecture appears to handle high-speed data, low-speed data, voice and video in a nonblocking mode at costs comparable to other technological offerings. In the near term, the acquisition of the established first-generation and second-generation switches may appear to be a safe decision, but it is often difficult to determine truly "safe" choices in the rapidly changing technologies. **OA**

Pringle is a market research analyst with Intecom, Inc. of Allen, Texas, a manufacturer of communications switching systems for voice and data transmission.



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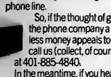

LOCAL NETS AND PBX

MAKING CONNECTIONS

By Edward Horrell

Although local-area networks have stimulated a great deal of discussion, they are not being installed as rapidly as many would believe.

The technology of local-area networks has been greatly developed, but users seem to be very undecided about the type of network (or networks) to install.

Generally, local-area networks fall into two categories: broadband or baseband. Broadband local-area networks use frequency division multiplexing technology, which allows multiple data streams concurrently on the same media. Frequency division multiplexing breaks the wide band-

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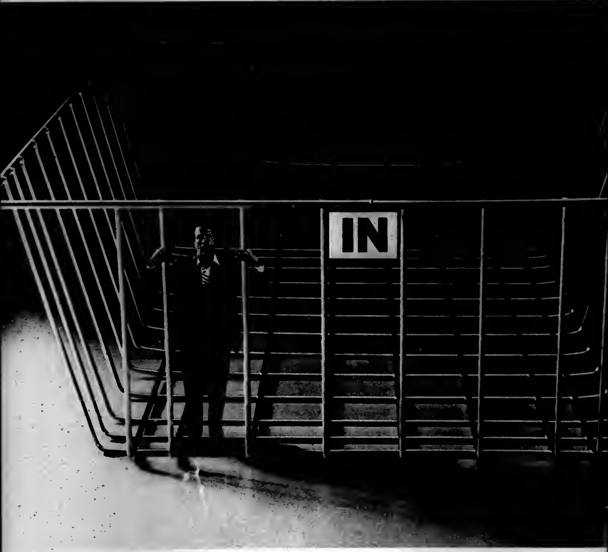

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width into narrower bands, each of which is used for a separate channel.

The medium involved is usually coaxial cable.

Because the telephone set is found with much more frequency than data terminals, using its cable plant is an attractive way to reach most users.

Baseband local-area networks utilize time division multiplexing technology on a demand-oriented (CSMA/CD) or predictive (token bus) basis. Time division technology is based upon the establishment of a channel intermittently, usually at regular intervals, to connect the terminal device to a common channel. The media for this type of network are usually twisted-pair, coaxial cable or fiber optics.

Arguments are voiced regularly about which of these concepts is superior. Depending on the specific application, each appears to have a position of acceptability in the marketplace.

As the need for extremely high transmission rates becomes prevalent, the cost of baseband interfaces will become a deciding factor.

The most commonly discussed advantage of the private branch exchange as a local-area network is the use of the telephone cable plant for the data switching. In some cases, the coder/decoder is located in the switching cabinet, as with Northern Telecom, Inc.'s SL-I system; in others, it is in the telephone set itself, as with some proprietary sets from Rolm Corp. and Western Electric Corp. In either case, common cabling can be used for simultaneous voice and data communication.

Because the telephone set is found with much more frequency than data terminals, using its cable plant is an attractive way to reach most users. Therefore, one beneficial local-area network objective is met very quickly — the relatively inexpensive premise-distributed cable.

Although early digital PBX generally supported only low-speed Ascii/teletypewriter-type devices, most leading manufacturers now support a wide range of protocols and transmission speeds. A 3270-emulation is now prevalent, with Systems Network Architecture announcements being made as well as direct connections to mainframes.

Coupled with continued increases in transmission speeds, these announcements indicate the further feasibility of the PBX for local-area network applications.

In fact, indications are that twisted pair will reliably support speeds of well over 2M bit/sec — a far cry from the early 9,600 bit/sec rates or even the more present 56K bit/sec.

An even closer look indicates that the PBX has still more advantages for local-area network applications. One of the most significant and rarely discussed advantages is modem-

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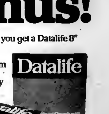

pooling. Through modem-pooling, the user of dial-up modems for off-premise data transmission can share modems among various users.

Instead of a modem being dedicated to an infrequently used terminal device, it can now be accessed on an as-needed basis by numerous users.

The benefit of shared devices is statistically as beneficial as the comparable concept of PBX trunks vs. private lines.

In other words, fewer modems serve more users. As off-premise data bases become more and more popular, modem pooling will be a virtual necessity for PBX local-area network users.

Most of the leading PBX manufacturers are emphasizing the development of combined voice/data terminals. These terminals are usually modemless, utilize twisted-pair media and provide simultaneous voice conversations and data transmission.

Most newer proprietary electronic telephone sets are also equipped with an RS-232C adapter for connections to nonproprietary terminals, if so desired. With the introduction and development of electronic telephone instruments, traditional 1A2-type sets that were popular for so many years — and are still in widespread use in the field — were made obsolete.

In addition to the inherent benefits of the PBX/local-area network concept, the features of the PBX itself offer numerous built-in advantages for local-area network applications. One of these features is the ability to queue on a busy terminal or computer port.

Another is the expanded use of traditional call detail recording used in conjunction with data switching for charge-back purposes to internal users.

In spite of the many advantages of the PBX/local-area network, inherent disadvantages also exist. Once again, individual users must understand the applications and needs of their particular companies.

The most obvious disadvantage of the PBX/local-area network is that both office systems and telephone system operate off the same processor or processors. This creates a risky situation in the event of system failure. In addition, system testing, hardware reconfigurations and software upgrades can affect the entire office system environment.

It should be noted, however, that some experts would argue that the single system concept is not a disadvantage, but is actually an advantage over separate local-area networks.

The most obvious disadvantage of the PBX/local-area net is that both office systems and the telephone system operate off the same processor. This creates a risky situation in the event of system failure.

At least on paper, the current bandwidth capabilities of PBX puts them at a disadvantage in comparison with separate local-area nets. Current PBX offer data switching capabilities of around 56K bit/sec; one manufacturer, Intecom, Inc., currently offers data rates at 1M bit/sec. Traditional local-area networks offer rates of well-upwards of 10M bit/sec.

Ztel Corp.'s recently introduced Private Network Exchange system offers multiple-ring topology at rates of 10M bit/sec and provides a unique approach to PBX/local-area network issues. It looks more like a local-area network than a PBX.

The transmission rate issue, however, must be closely reviewed by each user for each application. Paying for large bandwidth capabilities is useless if the application doesn't call for it.

Another disadvantage of the PBX/local-area network is the capacity of the CPU.

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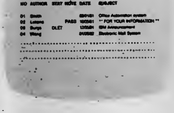

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In spite of numerous issues and possible pitfalls, the PBX will offer a natural migration opportunity for the implementation of local-area network capabilities and will provide a viable alternative for implementation.

products, a finite number of ports are available for voice/data connections.

In future, the point will come when the physical capacities of the system will be exhausted.

The problem for the volatile company, then, is one of planning.

How does such a company project growth? Does it purchase the larger processor now and grow into it, or wait and go through the trauma of changing CPUs later? And when it does reach that ultimate growth point where extra processing power is required, is it forced to buy a powerful additional CPU to handle a small number of devices? Unfortunately, the modularity of PBX is not sophisticated at the present.

When the decision is made to use the PBX/local-area network concept, the project manager then faces issues which are critical for implementation, such as the following:

- **Backup power.** The reliance upon one network for voice and data signaling can be disastrous in a power failure. Is the PBX/local-area network equipped properly for power failure? Is it uninterruptable? Is the intent to power CPUs, telephone sets and terminal devices?

If not, what are the effects for the users?

- **Cable plant.** In spite of vendor claims of simultaneous voice and data over universal cabling (twisted pair), many current PBX offerings require additional pairs of wire for such features as proprietary sets, central power and data switching. Are all jacks equipped for all functions?
- **Maintenance guarantees.** The local-area network concept itself assumes communication among a proliferation of devices. It must be assumed that these devices are installed and maintained by a number of different vendors. Where does the PBX vendor's maintenance responsibility begin and end?

If terminal devices are acquired from the PBX vendor, do they carry the same guarantees (for example, response time commitments) as the switch itself?

- **Growth.** Is the PBX equipped to handle an influx of devices that might be added to the network? If not, what are lead times for additional required equipment?
- **Moves and changes.** Assuming the PBX vendor has traditionally handled moves and changes of telephone-type devices, who will be responsible for moves and changes on the PBX/local-area network? The vendor? The user? What are the costs?

These are only a few of the issues that must be addressed when deciding whether to implement the PBX/local-area network concept. In spite of the numerous issues and possible pitfalls, however, the PBX will offer a natural migration opportunity for the implementation of local-area network capabilities and will provide a viable alternative for implementation.

One final point: Although the PBX/local-area network concept can be a total system application for some users, many will find that a combination of PBX and broadband/baseband local-area networks will best suit their needs.

With most PBX manufacturers developing gateways to separate local-area networks, many users will find a multinetwork environment feasible and attractive. OA

Horrell is president of Mitchell & Horrell, Inc., consultants in telecommunications management located in Memphis, Tenn.

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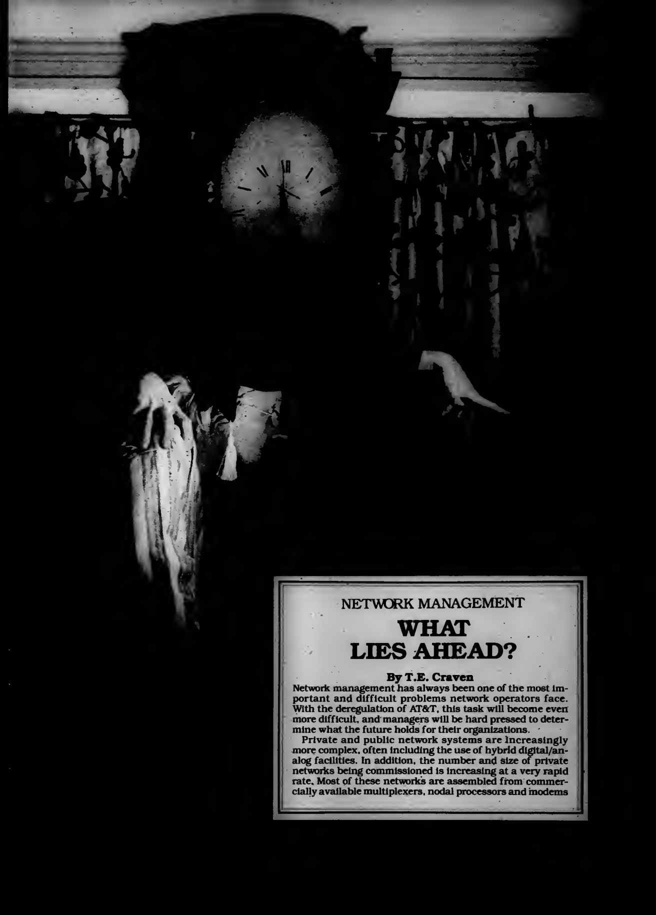

NETWORK MANAGEMENT

WHAT LIES AHEAD?

By T.E. Craven

Network management has always been one of the most important and difficult problems network operators face. With the deregulation of AT&T, this task will become even more difficult, and managers will be hard pressed to determine what the future holds for their organizations.

Private and public network systems are increasingly more complex, often including the use of hybrid digital/analog facilities. In addition, the number and size of private networks being commissioned is increasing at a very rapid rate. Most of these networks are assembled from commercially available multiplexers, nodal processors and modems and tailored to the user's requirements — which alter with time and business circumstances. And, although this customization solves one user need, its cost is high: increased diagnostic and performance problems.

Many equipment manufacturers provide excellent diagnostic aids for their own equipment, but they cannot provide equivalent facilities for other elements of the network. As a result, the operator faces a major challenge just staying abreast of what is happening in the network. The recent spate of mergers and acquisitions, (especially in the banking and savings and loan industry) are bringing together networks of dissimilar design and making a bad situation worse.

Most network operators take a very serious view of network management, and this concern is reflected in the proliferation of companies that are offering add-on diagnostic and performance measuring systems. This market is currently running at $200 million per year in equipment installations and will rise to approximately $2 billion by the end of the decade.

Most of these systems effectively add another layer of networking in an attempt to find out and control what the underlying level is doing. The better systems also provide information to the user in easily understandable form — for example, through a graphics display. Overloads or potential failures may be indicated by alarms that sound when preset limits are reached.

Until now, network operators have at least been able to rely on the knowledge that, with few exceptions, one company owned the copper connecting wires. True, in certain parts of the country, different jurisdictions existed and this occasionally caused problems when faults had to be pinpointed to a specific line segment.

With the breakup of AT&T, the user's situation is going to be considerably worse. Many leased lines will now go through several jurisdictions: those of the local and remote operating companies and of the long-haul operator. As things get more confused, that long-haul operator may be AT&T, a reseller or a provider of alternative facilities — for example, the companies now laying optical fiber down railbed rights of way.

The effect of this situation on the network operator is that he is now going to have to take responsibility for many management functions and diagnostic tests previously carried out for him by the telephone company. The providor of a leased line will be interested in giving a good service level to its users. However, it is also obvious that the major motivation of the new local operating companies' management will be to show a profit. Before they use expensive resources to find and fix a problem, these companies will want to be certain that problem is within their jurisdiction.

One effect of the AT&T breakup is that the network operator is now going to have to take responsibility for many management functions and diagnostic tests previously carried out for him by the telephone company.

The next two or three years are clearly going to be difficult while network operators and providors of service learn to cope with the new situation and the new rules.

During that time, well-informed and intelligent network operators will be well advised to find the greatest protection they can.

The solution will not merely be providing better diagnostic equipment to find out whether the fault is in XYZ's equipment or the network equipment. If it is in the XYZ equipment, which operating company line has the problem? Because of the nature of the AT&T breakup, the places where jurisdiction changes ground are simply not accessible to the network operator. Clearly, more reliable equipment and equipment capable of working satisfactorily in noisy line conditions will be part of the answer, and great pressure will be put on manufacturers to provide such equipment.

However, that's not the answer, either. Pressure is also being exerted in precisely the opposite direction. The breakup of AT&T is having another effect: The cost of leased lines themselves and the

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provision of other facilities such as bridging is expected to rise rapidly. The first skirmishes in this war for both data communications and voice service are currently being fought. Both the technical press and the general-interest newspapers are charting the day-to-day victories and setbacks as the various elements of the telephone companies attempt to redistribute the expenses and revenues formerly spread right across AT&T. The cost of leased lines has been increasing for years and it won't be reversed by the effects of deregulation.

In self-defense, network operators are putting pressure on manufacturers to provide equipment that uses expensive facilities more efficiently, is capable of operating at high line speeds, uses complex data compression techniques and so on. Generally, more complex equipment is more sensitive to the environment and more error prone than simpler lower speed devices. Falling back to simpler, slower methods in case of trouble is a reasonable and well-used solution to these problems. But that solution implies the ability to monitor performance and reliability of the line segments.

If the operator cannot easily comprehend the information being presented, he is unlikely to make correct or timely decisions. It must be easy to monitor usage, track costs and isolate problems.

And there's the catch. Again, better and simpler diagnostic equipment is part of the answer and will no doubt be forthcoming. The real solution lies in the area of continuous monitoring and control.

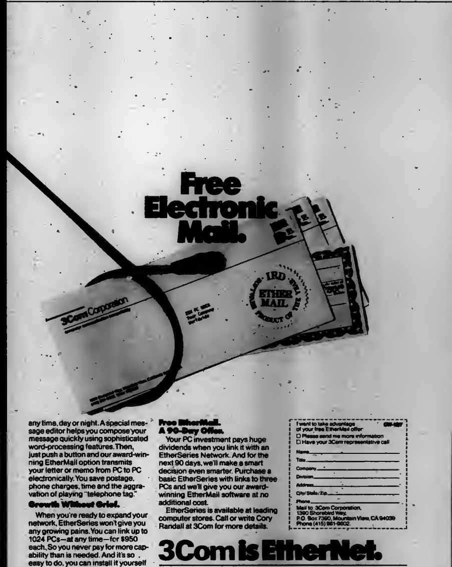
Consequently, the future will undoubtedly require more and more extensive network management facilities. A few years ago, users wanted to know all about the performance of the network — throughput, bandwith, number of hits and speed. When the discussion turned to network management, interest dropped markedly. Now the situation is completely reversed. Those with network experience ask first about the network management capability; if they are satisfied with your answer, they may listen to what you have to say about performance.

Despite the present and continued success of companies selling the bolt-on network management facilities, it is difficult to anticipate the way any network will grow and change. Network management should be a built-in property of the network components themselves. Data on network elements and line segment performance should be gathered on a routine basis and made available so that the operator can make informed decisions. Whether provided internally from the network elements or externally, the network management system should provide the user with very comprehensive information about current and past performance of the network. At least the following should be available:

- Error statistics, the number of bits or blocks an hour handled by the network in various parts, ideally on a port-by-port, node-by-node, line-segment-by-line-segment basis. The data base should be updated at regular intervals to detect statistical variations by the hour of the day, day of the week, equipment type or line speed.
- Response time, measured on a path-by-path and by-direction basis.
- Loading, both line and node.
- Utilization, both terminal and port.
- Directory of network elements.

All the above categories must be contained in a data base with manipulation tools that allow relevant statistical and operational data to be presented to the user in an easily understood manner. If the operator cannot easily comprehend the information being presented, he is unlikely to make correct or timely decisions. Essentially, it must be easy for the operator to monitor usage, track costs and isolate problems.

What does all this tell us about making choices in today's environment? What guidelines can a user follow in adding to an existing network or commissioning a new one? An intelligent user will look for excellent network management capabilities, either pro-



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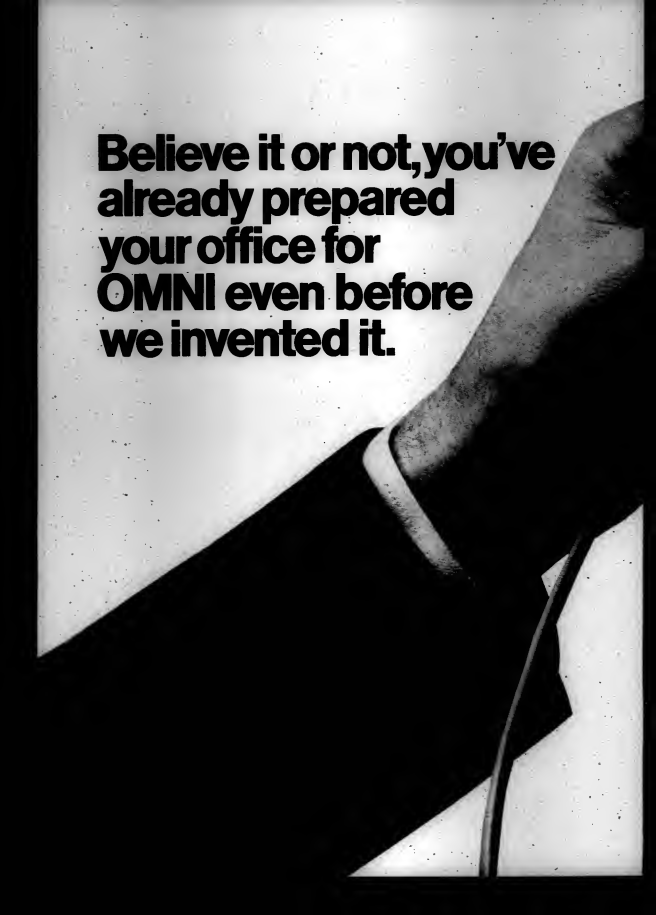

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vided inherently in the network elements or externally by means of a specially designed system. The former choice is far more preferable; it is more complete and has access to information that is difficult to provide to an external system. If the elements are designed properly, they will cope easily with changes and additions to the network.

> ***It should be possible to apply diagnostics for any part of the network from any point. This implies a single coherent technology for the design of all portions of the network, independent of transmission speed and media.***

At a minimum, the network management system should provide the functions listed above. Furthermore, a modern system should provide more than mere statistics to the operator — it should in a very real sense manage the network. Sufficient diagnostic capability should be available to enable close identification of existing or potential problems and, as far as possible, to track them down to the source. As pointed out earlier, this may not be an easy task in the aftermath of the break-up of AT&T.

A main user requirement is that current problems be solved and potential problems avoided. This means that a key element of network management is restoral of the system for the user. If this is to be possible, the network manager not only must have the ability to amass and analyze information, but must have under its control any redundant elements or backup facilities provided. Reconfiguring completely automatically or under user control will be necessary to allow the operator to let noncritical parts of his network remain nonoperational, rather than disrupt critical functions during a restoral activity.

Methods of providing restoral must be carefully designed at the outset. With the current tendency for line installation service cost to escalate rapidly, careful design must minimize user cost of redundancy features. One clear advantage can be found in the use of dial-up as a temporary alternative until a repair can be effected. If the subsequent reduction in potential line performance is acceptable to the user, dial-up provides a very low-cost backup capability. However, only certain network configurations can make use of this method without a high overhead in automatic answering equipment.

Another aspect of the management function should be for the network manager to keep a record and control of the network configuration at all times.

A complete network management capability faces a major obstacle in the form of different technologies and equipment now used in the various parts of networks, mostly governed by line speeds. For example, the gateways between existing local-area networks using high-speed coax and wide-area networks using the telephone system usually mean one thing to the operator — he won't have good visibility of all his network functions.

The total data network, whether inplant, intraplant, intrastate or interstate, should ideally be transparent to network management. It should be possible to apply diagnostics for any part of the network from any point. This criterion implies a single coherent technology for the design of all portions of the network, independent of transmission speed and media.

So far, no single product has covered this broad spectrum of user requirements. In the future, however, multiplexers and network nodes will undoubtedly offer considerably more functionality and support eveything from basic multidrop lines through data chaining and distributed switching systems, with fully compatible modular elements. They will also support existing protocols as well as new ones; be able to access other network standards, such as X.25 and Systems Network Architecture; and will support satellite operations and data/voice communications. **OA**

Craven is director of technical support for Doelz Networks, Inc. in Irvine, Calif.

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A LOOK AT '83 AND '84

YESTERDAYS' MENU TOMORROW'S FEAST

By Glenn Rifkin

For years, the leading computer makers have been promising that communications would soon become a major priority. The best, it seemed, was always yet to come. In 1983, the promises continued, but numerous events showed that, this year, vendors were finally getting serious about communications.

Though many factors contributed to this proliferation of communications activities, the burgeoning office market has been as much a driving force as anything. For office automation to be of use to anyone, practical and cost-effective communications is a widely agreed upon must. In

1983, communications grabbed a lion's share of the headlines. If industry analysts are correct, in 1984 those headlines should be turning into hands-on reality in the office.

In communications, if 1983 was the year of anything, it was the year of the announcement. Major vendors in both computing and telecommunications areas unveiled long lists of products and capabilities that carried 1984 delivery dates.

Although announcing a product is a long way from delivering on its promise, the direction of most announcements made it clear that vendors were finally responding to users' needs. "Communications has always been looked at as a distinctive issue, but the most important trend in 1983 was that communications was viewed as an integration issue," said Walter Ulrich, president of Walter E. Ulrich Consulting in Houston. "It became obvious that single-medium systems were deficient and there must be an integration of all technologies."

The divestiture of AT&T continued to generate news throughout 1983. Ulrich called the move toward divestiture "the most dynamic restructuring of an industry that I can think of. There's nothing to match it." Despite the interest in the direction of AT&T's Advanced Information Systems and the independent operating companies, industry watchers viewed 1983 as a year of disappointment with AT&T. "We had heard great promises about workstations and other products, but AT&T was shackled in '83. They were really not able to show their cards," said Dixon Doll, president of the DMW Group, Inc. of Ann Arbor, Mich.

Doll anticipates an impressive line of products from AT&T when divestiture officially takes place on Jan. 1, 1984. His concern is whether or not AT&T is too late in the office market. "There's no doubt that they can do a good job in the OA area, but how many companies are willing to live with multiple workstations on the desktop? AT&T is fighting a tough challenge and will have to give some good reasons to go with them. Their problem will be a marketing one, not a technical one," he said.

AT&T and other telecommunications vendors will also face stiff competition from the newly emancipated operating companies, according to Paris Burstyn, an analyst with Arthur D. Little Decision Resources in Cambridge, Mass. "People thought the operating companies would have close ties to the mother camp, but that hasn't happened at all," Burstyn explained. "In fact, it is just the opposite. That bodes for tremendous competition in telecommunications in '84. The operating companies will come to the office and say 'we can be your one-stop shopping place for communications.'"

Though the shadow of divestiture covered the communications industry, both systems vendors and independent communications vendors refused to slow their efforts. If anything, the prospect of things to come made communications issues more important than ever.

One of the major trends in 1983 was the teaming of private branch exchange (PBX) vendors and major computer manufacturers. Some critics suspected system vendors might just be protecting their territory from PBX makers, but others felt the long list of partnerships was a clear indication that user demands were forcing collaborations. Among the significant ventures in 1983:

- IBM purchased 15% of Rolm Corp. and indicated Rolm would be its partner to link computers with telephones in the office.
- Data General Corp.

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signed an agreement with Northern Telecom, Inc. to allow Northern Telecom's Displayphone to work within DG's Comprehensive Electronic Office (CEO) system.

- Hewlett-Packard Co. signed agreements with Rolm, Northern Telecom and Intecom, Inc. while committing itself to the PBX as its principal communications network in the office.
- Honeywell, Inc. and Swedish-owned Ericsson Information Systems established a research company to develop voice and data communications products for the U.S. market.
- Digital Equipment Corp. and Northern Telecom announced a jointly developed computer-to-PBX interface standard.

"It makes sense for companies to take advantage of each other's expertise," said Edward Horrell, president of Mitchell & Horrell, Inc. of Memphis, Tenn. "The trend toward the connection of noncompatible terminal devices through a PBX has been talked about. In 1983, companies started doing it."

In fact, the PBX has emerged from 1983 as a major office technology and is being seriously considered as a local-area network substitute for many applications. PBX vendors, seeking higher speed and high-capacity services with lower costs, provided evidence that they will be a significant force in the local-area network market.

AT&T's Advanced Information Services introduced its Dimension AIS/System 85 digital PBX, which features a separate CPU from the one that switches voice and data. This additional CPU will reportedly handle voice store and forward and electronic mail. "The System 85 should really give the Rolms and Northern Telecoms a run for their money," said George Colony of Forrester Research, Inc., a Cambridge, Mass., consulting firm.

Ztel, Inc., an Andover, Mass., firm, displayed a communications system called the Private Network Exchange (PNX), which is said to combine the voice features of a PBX with the data transmission capabilities of a local area network. Scheduled for March 1984, the PNX reportedly offers a much wider bandwidth for high-speed data switching, as well as voice and video communications. If the product performs as stated, it could become very significant in the PBX vs. local-area net debate, according to Horrell.

Despite tremendous interest in 1982, the local-area network market was "fairly flat" in 1983, according to Colony. "We didn't see nearly the velocity we had predicted." He attributed this to users' waiting for IBM to announce its local-area network, an event predicted for the first or second quarter of '84. Colony said he foresees great movement in that market after the IBM announcement and predicts that it will speed up deliveries from all local-area network vendors.

Stating the obvious, Ulrich called the IBM local-area network "extremely significant." Although it won't be introduced officially until early 1984, the IBM network is reportedly based on a token-passing baseband approach. It is destined to become a de facto standard for the industry and, according to the International Resource Development of Norwalk, Conn., will lead to a "blurring of the distinction between the voice world, the 3270 network world, the Ascii terminal world and the personal computer world."

Although many vendors have decided to wait for IBM to make a move, 1983 saw a major breakthrough for Ethernet, Xerox Corp.'s local-area network.

Though many vendors have decided to wait for IBM to make a move, 1983 saw a major breakthrough for Ethernet, Xerox Corp.'s local-area network. In June, the Institute of Electrical and Electronic Engineers' (IEEE) 802 Standards Committee voted to approve the CSMA/CD local-area network upon which Ethernet is based. Major vendors, such as DEC and Intel, gave strong indications they would increase their support for Ethernet in 1984. Though Ethernet has not caught on in the office as its originators hoped, it has remained a viable factor in the local network debate.

Other major vendors are remaining steadfast in their search for their own standards in the local network market. Wang Laboratories, Inc., for example, stood by its Wangnet offering in 1983 and has recently announced a joint proposal with TRW, Inc. for a dual-cable broadband local-area network standard "designed to meet the information transfer needs of broadband network users." The two companies stated that there is a growing demand for such systems and have submitted the proposal to the IEEE 802 Standards Committee for consideration.

Colony also predicted that AT&T would introduce a local-area network in 1984, but cautioned that its impact would be minimal initially because of the scarcity of AT&T products to attach to the network. "IBM has the right idea," Colony explained. "They waited until they had about 3 million potential nodes to tie to their network before showing it. AT&T will be like Xerox. What good will a network be without products to tie to it?"

The influx of personal computers into the office in 1983 was a driving force for the search for standards in the network market. "Most business users appreciated that if they were to do meaningful work on a personal computer, they would need communications. Communications is an absolute imperative and I think the vendors realize it," Doll said.

Tom Elliott, analyst at International Data Corp. (IDC) added that, driven by personal computers, the local-area network market will take off: "1984 will be a good year for network vendors."

Vendors are also realizing that the PBX is becoming a more attractive local-area network alternative. Telephone wiring is already installed everywhere and customers are cool to the thought of adding more cable to already overstuffed ceilings and floors. Although questions have been raised about PBX capacity for voice and data transmission on a scale needed to be a true local-area network, the trend appears to be in the direction of an integration of technologies rather than one single answer.

Doll expects to see local network emulation capabilities from all major PBX manufacturers in 1984. He is convinced that a priority for next year includes the integration of multivendor networks: "We haven't done much on that up to now. Vendors have recognized the need to coexist with IBM. That was the first step. In 1984, they are going to realize they need to coexist with a lot of other equipment besides IBM."

DEC, acknowledging that an IBM link was essential, made a major announcement in 1983 with the introduction of its DECnet/SNA Gateway, which allows VAX superminicomputers to access IBM SNA resources. The move reportedly affirmed DEC's direction of compatibility with IBM.

Of course, IBM did not sit idle in '83. Out from under the antitrust cloud that shadowed it for 13 years, IBM began to flex its office muscles in 1983. Toward the end of the year, it began to show it had no intention of being a follower in the communications field. Along with the investment in Rolm, IBM announced a stream of products and enhancements that provided the long-sought-after connectibility among its products.

Industry consultants were particularly impressed with the communications potential of the recently announced IBM 3270 PC and the IBM PC XT/370 in closing the micro-to-mainframe gap. Those products, due out in early '84, reportedly give IBM the ability to access host processor applications in the VM/CMS operating environment and concurrently use those applications with programs running under PC-DOS.

The linkup of micro to mainframe was among the hottest issues of 1983, with others besides IBM addressing the question. Software makers like Cullinet Software, Inc. and Visicorp did announce products to accomplish the task, but these also carried 1984 delivery dates.

Colony pointed out that the hype is overhanging the technology; the reality of creating the micro-to-mainframe linkup is tougher to complete than had been thought. "With the 3270 PC and the PC XT/370, a lot of those problems will go away. I think third-party developers will take advantage of these products even faster than IBM itself."

Going into 1983, Ulrich said, the value of the microcomputer was less than it is now because there was no practical micro-to-mainframe link. The ability to download and share files through communications links makes the micro an invaluable OA product, he said.

IBM also came closer to realizing its 1980 promise to link its office systems when it announced enhancements to its Distributed Office Support System (Disoss) and Professional Office Systems (Profs).

Doll pointed out that though most of the Disoss environment had been built around "klugey" IBM processors such as the 8100, Big Blue is starting to make connections to their newer products. He predicted a direct PC-to-4300 linkup sometime in 1984.

According to Doll, 1983 was also the year IBM made it clear that its Document Interchange Architecture-Document Content Architecture (DIA-DCA) would be as important in the next 10 years as SNA has been since 1975.

Announced in 1982, DIA-DCA is a protocol architecture for the office environment and sets standards for document handling and document formatting. In 1983, compatibility with the architecture, which operates within a Disoss environment, was announced for IBM's 8100, Displaywriter, 5520 and Scanmaster products. Dale Kutnick, executive director of the Boston-based Yankee Group, predicted that in the third quarter of 1984, IBM would announce DIA-DCA compatibility for its Personal Computer.

"When that happens, there will suddenly be more than 2 million nodes in that environment and DIA-DCA will become the de facto standard in the office," Kutnick said.

DIA-DCA is important because the architecture is ideally suited for professional office automation; it facilitates the transfer of documents, not just data. "The whole point of office automation is that professionals want to see documents, not data," Kutnick said.

This year, Doll pointed out, the other major office automation vendors such as Wang and DEC recognized that they could not offer only proprietary solutions for their office systems and they announced intentions to seek compatibility with DIA-DCA.

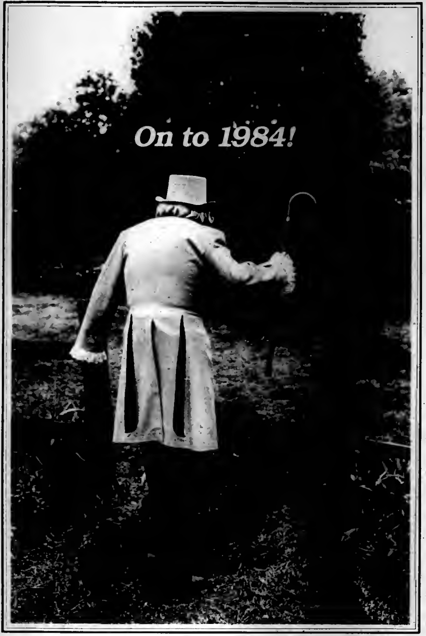
"Many orphan vendors will offer compatability with DCA in 1984. They wanted to in 1983, but DCA was like a train going by at 150 miles per hour," Colony added.

IBM is also expected to be a major player in the PBX market in 1984, according to a report from International Resource Development, Inc. With its connection to Rolm, IBM may emerge as the leader in data/voice workstations, intelligent telephones and other PBX-linked OA devices.

"IBM's ability to set standards and add respectability to new kinds of products will do much for the overall peripherals marketplace, an area taking on increasing importance to vendors as the sales of full-fledged PBXs continue to slow. Thus IBM is expected to do for PBX add-ons what it did for personal computers," the report concluded.

In 1983, it also became apparent that there would be increasing stress on the terminal device as the ability to communicate within networks and with the mainframe increased. Industry consultants agreed that one significant trend was the increase in the number of workstation choices available to meet increasing demands. As consultant Horrell pointed out, the changes will come in the terminal devices and not in the networks: "It makes sense to upgrade the terminal device because, once installed, the network isn't going to change."

Ulrich offered the opinion that the increasing availability of both long-haul and local-loop communications would have a significant impact in 1984. The industry is finally seeing the fruits of the great spirit of deregulation that proliferated in 1979. Technological advances and a freer opportunity for competition (in such areas as the 10 gigahertz frequency range) will produce the greatest change in communications since the FCC was established, Ulrich predicted.



New technologies like cellular mobile radio transmission (which uses a large amount of lower powered radio cells) will free many local communication channels. In New York, construction began on a $350 million satellite communications center, Teleport, which will include key switching points to carry voice, video, data, facsimile and teleconference signals throughout the metropolitan area.

OA will also feel the effects of such new express mail services as MCI Communications, Inc.'s MCI Mail, which addresses the problems of reaching people who are off the network. MCI is suddenly a major player in the electronic mail arena with the ability to send instant, four-hour, overnight or next-day mail from anyone with a word processor, personal computer or data terminal.

Ulrich called it a revolutionary system — the user gets charged only for sending mail, not for logging in. MCI estimates the new system will be 90% less expensive than other time-sensitive mail services.

"This announcement will greatly enhance the public's awareness of office automation. OA systems are usually marketed just to OA managers, but MCI is going to the general public with this one," Ulrich said.

Inevitably, the realities of next year will fall short of the hype that surrounds the vendor announcements. It is beyond question, however, that 1984 will be a most significant year for communications.

The big push in this market, will make the competition fierce. The winners will win big, Horrell said, and "the weaklings are going to bite the dust." OA

Rifkin is a staff writer for Computerworld OA.

Facing the Future's Expert Systems

By Robert Keller

The power of the computer is rapidly becoming available to virtually everyone in our society, regardless of training or educational background. The new age of computing, which I prefer to call the Age of the End User, is supported by significant advances in several areas. Of particular near-term interest are artificial intelligence systems which allow direct user-computer communications, techniques for storing knowledge as opposed to factual data and devices that can manipulate the physical environment.

Natural communication between end user and computer is perhaps the most enabling feature of the new generation of systems. It means, for example, being able to address the computer in natural, conversational English. For now, we are still bound to use a keyboard. Within the decade, however, technology for voice recognition is likely to be commercially available and the keyboard will be used more for specialized input such as mathematical equations.

Techniques for storing connections between facts rather than just the facts themselves are allowing the computer to appear to have a human-like understanding of real-life situations. These intelligent expert systems have been applied to planning and decision-making activities outside the office and are now ready for use in the business environment.

Perhaps the least publicized area of the new revolution is artificial intelligence robotics, devices that can see, hear and intelligently manipulate their physical environment. With the refinement of techniques by which a machine senses its environment, devices will appear which combine all three major artificial areas: natural communication, intelligent understanding and action in the physical world.

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Underlying all types of systems is a new emphasis on integration. In the new age office, the order of the day is systems integrated either with each other directly, through common knowledge bases, or by sharing a common communication medium: natural English.

For a better understanding of the possible effects of the artificial intelligence tools, let's take a tour of the office and see how the tools are and might be applied in practice.

Personal service is an important part of a visitor's introduction to our company; it is therefore unlikely that we would want to replace the receptionist with a robot. Nonetheless, many tasks performed in this area require skills that could be relegated to an intelligent computer.

The telephone system is one example. Most central switchboards no longer have patch cords, but they have an equivalent electronic nightmare of lights, and prescribed sequences of button pushings to accomplish message switching, recording and paging. The telephone of the future will need no buttons because "dialing" will be made possible by voice commands. Why not just give the receptionist an ultra-miniaturized wireless lapel microphone and headset tuned to the company's expert message-handling system?

In this scenario, an incoming call will still be answered by the receptionist, but much of the follow-up can be handled by the system.

For example, the receptionist might say to the system, "A call for Ms. Reynolds." The system would understand the complex details of finding this person and connecting her to an incoming call.

This procedure may include simply ringing her phone or it could mean analyzing her computer-stored calendar, interacting with her secretary to discover where she is, forwarding the call to another number or perhaps paging Ms. Reynolds. All the while, the caller is kept informed automatically of the progress of the search.

If Ms. Reynolds cannot be located, the receptionist is notified and once again establishes personal interaction with the caller. The system may be invoked again: "Please take a message and route it to electronic mail for Ms. Reynolds."

Another use of artificial intelligence is in the area of computer-aided instruction, an application of expert system technology in which the computer becomes an intelligent teacher for a particular subject. The training center of the near future will still contain live teachers, but their roles may tend to move toward consultation and designing the protocol of teaching systems for their areas of expertise. The actual instruction in basic concepts could be done through student interaction with an intelligent computer tutor.

The main characteristics of the new computer trainers are an expert understanding of a particular field, an ability to tailor training to the skill level of different students and facilities for mixed initiative training. That is, the student may explore the knowledge base in a query mode, or the system, detecting possible deficiencies in the student's understanding, may take over the questioning.

Intelligent tutors have been applied to training in electronics, steam plant operation, programming languages and other areas. These systems are equally applicable to other office training situations. In fact, any area is a candidate for an intelligent tutor if it requires training of novices and if a well-defined knowledge base can be developed for the area.

Many administrative tasks also require careful examination and analysis of forms against certain standards. Reviewing expense reports is a classic example of such work, and in situations where many people travel frequently, controlling expense reports is a tremendous burden.

Why not establish a knowledge base that contains the rules of acceptability of expense reports and let an expense expert system evaluate them? Not only can the system make intelligent judgments about the acceptability of the report, but it might also make adjustments automatically to bring the report within acceptable guidelines.

In still another important area of the office, the long bare conference table of today could be replaced in the future by a table with a workstation at every location. Each station would be both a personal computer and a link to a central mainframe. Communication with the machine might be by voice input of natural English statements, by keyboard or by some graphics input device such as a digitizing tablet.

In addition, a centralized projector and screen would allow common viewing of information from the computer as desired. Local screens and graphics printers would allow each individual to review material before presentation to the group.

The mainframe contains large knowledge

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bases on every aspect of the company's business, including sales, financial and competitive information as well as general economic and other knowledge from the world at large. Although companies have collected and stored such information for a long time, it is only recently that the technology has been available to manipulate such information easily and intelligently, to have the system use decision factors from many areas to draw meaningful conclusions. We now have the technology to produce decision support systems capable of making real decisions in the same way an expert in the field would do.

The DP department, too, is likely to see dramatic changes in hardware and tools available for building and maintaining systems.

Fortran, Cobol and other such languages will certainly not disappear for a long time. They are, however, likely to become vestiges of a past age to be emulated on the newer machines as a temporary convenience. Basic business systems are likely to be rewritten in a form that can take advantage of new capabilities for speed, flexibility and intelligence.

System development in the new age office will tend to become an on-line interactive process between analyst and user groups. In such an arena, user wishes, depicted possibly as data flow diagrams, will be rapidly turned into working prototype systems by connecting various primitive functions or behaviors in unique ways.

Symbolic hardware processors and very high-level software techniques are available now. These applications are either possible now or well within the realm of possibility in this decade. Whether they are actually done depends more than ever on the computer service consumer. The Age of the End User brings with it not only new facilities, but also a new responsibility for end users to guide the application of technology in directions that will be truly useful.

We can draw an analogy to the television industry. If you have a television set you can choose any of several programs to view, but your choices are limited to those preprogrammed by the station. Changes in the station's offerings are based on feedback from viewers, but this feedback is generally remote and indirect and frequently results in changes that are somewhat off the mark.

Until recently, the end user, the consumer of computer services, has been cast in a similarly passive role. Hardware and software technology have been evolved by people who are often several steps away from daily contact with the systems they build and from the people who use the systems.

With the advent of interactive television, viewers can provide immediate feedback. Similarly, in the new computer age, the end user has the opportunity to become a cocreator of the systems he uses. The future office will be as you, the end users, envision it.

Where is automation going? The answer to that question lies in your answer to questions like those that follow. What is your vision of the office of the future? How could your work be more effective if you had a fast, intelligent, tireless assistant who speaks your language?

The time is now for end users to envision and take charge of their future relationship to a very user-friendly, intelligent computing environment. OA

Keller is president of Renaissance International Corp., which consults in the field of artificial intelligence and teaches seminars in artificial intelligence in cooperation with Yourdon, Inc.

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Image Processing

A new technology knocks on the office door, but is it an important office tool or merely a niche product?

By Glenn Rifkin

At the same time that a majority of office automation planners are still attempting a smooth implementation and integration of such basic tools as data processing and word processing, an even newer office technology is making its debut.

Image processing — the digitization, transmission and, perhaps most important, integration of text, graphics and data — has recently made the giant step from idea to reality. And, depending on who is talking about it, this breakthrough represents either an essential office tool or a specialized niche product near the bottom of the OA priorities list.

Datacopy Corp., a small firm in Palo Alto, Calif., announced in Sep-

tember that it was introducing an electronic digitizing camera that interfaces with the IBM Personal Computer. However, interest in image processing really began to soar when Wang Laboratories, Inc., unveiled its Professional Image Computer (PIC) in October.

Positioned as part of Wang's Professional Computer line, the PIC system can reportedly process images, words and data while achieving full networking capability with all of Wang's office products via Wangnet. The major difference between the Wang and Datacopy systems is that Datacopy offers only a high-resolution camera with no application software and no networking capability. The Datacopy system is less expensive than the PIC system, but Datacopy is only offering its product to the OEM market at the present time.

The Wang system includes a desktop camera-like scanner that digitizes images and a high-resolution monitor that can display that image. When the image is on the screen, it can be manipulated and integrated with text and data using a variety of image processing software. It can also be transmitted locally or remotely within Wang's office systems.

The ability to integrate images with text and data within the workstation environment moves the technology from the facsimile level to an area in which it becomes a potential contender for a significant slice of the OA budget.

Although Wang is the first of the major office vendors to announce an image processing system, it is undoubtedly not the last. Datacopy, which sells its camera in the OEM marketplace, has already sent systems to Hewlett-Packard Co., Apple Computer, Inc. and IBM for a closer look.

In fact, IBM has indicated strongly that its Scanmaster facsimile terminal, which already has the ability to scan and transmit images over a variety of IBM office systems, will soon have a high-resolution monitor for image and text manipulation. If and when that capability is announced, IBM will certainly emerge as a major factor in the image processing arena.

Wang has scored points by being the first to announce integrated image processing, according to Robert Costain, vice-president at Dataquest, Inc., a San Jose, Calif., consulting firm and subsidiary of A.C. Nielsen Co.

Although some OA watchers have expressed skepticism about where the technology fits into the office, Costain takes another view: "I don't see image processing as just another OA option. I see it as an absolute fundamental necessity for the office."

Despite the excitement among vendors concerning this emerging technology, not everyone is convinced image processing is all that significant.

Wang obviously agrees and, in fact, identified image processing as a key piece of the OA puzzle in early 1979, according to John Thibault, director of office systems marketing. Although he said the market will truly emerge in the next two to three years, Wang's announcements don't indicate the company is trying to shoehorn the product into the office.

"Many of our top 100 accounts are ready for this product and have asked for imaging capabilities directly," Thibault explained. "Everybody may not need a PIC today, but we hope that in two years everyone will want one."

At Datacopy, James P. McNaul, vice-president of marketing and planning, stated that imaging is going to become an inherent part of OA and credited Wang with legitimizing that step. Predicting a potential billion-dollar market as early as 1985, McNaul said prospective users include a large percentage of workers using clustered WP, standalone WP and personal computers.

"Image processing will offer businesses a chance to incorporate graphics into their documents in a way they never have before," McNaul said. "We're used to graphics in all parts of our work life, but we don't use them in reports because of the cost. With office communications and laser storage coming together and with costs falling at the same time, imaging is going to be vital."

IBM, with its high-speed Scanmaster 1 facsimile machine now capable of running Distributed Office Support System (Disoss) 3.1, has the potential to turn that product into an imposing image processing system. Scott Bower, IBM product administrator, said the system currently addresses two major office issues — priority mail and filing — and acknowledged that the ability for Scanmaster to interface with a high-resolution monitor was a "known priority." He indicated that that capability was close at hand and was simply a matter of software development.

Despite the excitement among vendors concerning this emerging technology, not everyone is convinced image processing is all that significant. Though Wang's announcement generally was greeted with admiration for the technical achievement, there was much skepticism among consultants and users about both the specific product and the technology. There has been criticism that the resolution on image processing systems must be of higher quality for it to be of use for anything more than low-level graphics. In addition, the call is out for an optical character recognition (OCR) capability which would allow each character to be defined individually rather than in the bit-mapped mode. This would result in far lower storage requirements and would allow type to be manipulated and interpreted in any font style.

Amy Wohl, president of Advanced Office Concepts, agreed that there is a need for integration of images at the desktop level, but she insisted that the price is simply too high. Wang has offered three configurations of the PIC system ranging from $12,115 without a scanner to $26,730 fully configured. "There is only a limited market for a $26,000 product. I can see a genuine use in specific applications, but it doesn't fit well into the world of mixed workstations," Wohl stated.

Helen C. Barnes, vice-president of the Equitable Bank in Baltimore, Md., added, "It may not be long before we say, 'How did we live without this?' But to do any-

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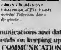

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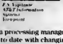

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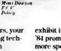

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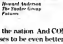

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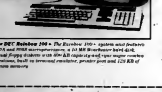

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thing in quantity, you won't be able to convince management to spend $15,000. For it to be widespread, it will have to be in the $5,000 range."

Another serious criticism involves the storage capacity necessary to handle the image processing systems. The Wang system, for example, employs a 10M-byte Winchester hard disk that can reportedly handle only 100 to 120 pages of image-processed information. The number of bytes needed to digitize images in a bit-mapped display is based on the density of the image and can be very high. Companies interested in the technology agree that future directions for storage will focus on laser optical disks, currently an unproven and high-price medium.

> ***"For image processing to be widespread, it will have to be in the $5,000 range."***

Thibault of Wang countered the charges by arguing that the user is getting not only the image processing capability, but also a personal computing workstation at the same time. For those with Wang Professional Computers installed already, image processing reportedly can be achieved for less than $5,000 by purchasing only a scanner and a high-resolution monitor. "We don't feel that pricing will make or break a product. When you look at the return on your investment, the cost per user is very low," he said.

Thibault admitted that Wang must achieve a more cost-effective storage mode. However, he pointed out that it is unlikely that the system will be required to store information in a stand-alone mode very often because the PIC can integrate with Wang's VS/IIS, VS/Alliance, OIS, and Professional Computer product lines. "Imaging does eat up a tremendous amount of memory, but you'll see that changing in the next year or so," added IBM's Bower.

Perhaps the most serious stumbling block for image processing is whether an actual need for the technology exists in the user community. Though OA managers tend to agree there might be certain special applications, the feeling is that imaging doesn't have a widespread appeal.

"It may be a lot cleaner way to handle image integration, but it's not a necessity," said F. Richard Lennon, vice-president of administration for Sikorsky Aircraft and formerly director of MIS for the Essex Group. "If we see a need at all, it is certainly in the latter phases of the OA process."

Kavin Moody, director of systems planning and research for Gillette Co. in Boston, said imaging might be of some limited use to certain niche markets, but "as a general OA requirement for the masses, I don't see it. Your business would have to be very heavily graphics-oriented and not already computerized. Often, what vendors think a product is good for and what we end up using it for don't correlate at all."

"I think what we've seen so far belongs in the class of the Xerox Corp. Star," Wohl said. "It's more sizzle than steak."

Wang is not scheduled to start shipping its PIC product until sometime in 1984, and it is too early to judge response. Dale Kutnick, executive director of

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the Boston-based Yankee Group, predicted that Wang would sell only 5,000 of the systems the first year.

Wang and the other office vendors are well aware of the criticism, but remain committed to image processing. Costain of Dataquest acknowledged that image processing would develop slowly and pointed out that the market has broken into three categories.

The most advanced area has been computer-generated graphics, the first stage of image processing, according to Costain. The second category consists of large record storage systems, a newer technology with many systems still coming to the market. The third category began with the Wang announcement — a higher value, lower volume image processing integrated into the information handling system.

Although the vendors are hesitant to pigeon-hole themselves, they tend to agree the banking and insurance industries, along with the federal government, are prime targets for image processing. Prior to image processing, the bales of incoming documents that could not be keyed into the system became the stuffing material for endless file cabinets. Now, proponents say, documents can be digitized, sent around an information network and either stored as needed or discarded immediately.

Costain said he feels that as more vendors come on-line, image processing will soon be accepted as a given. Images can add tremendous value to a document. "Images are so fundamental in the office that adding image processing to a system is an absolute necessity. Wherever you find a high value image-containing document, you have a good candidate for this system."

At Hewlett-Packard, there is active interest in image processing. Alex Morgan, of the personal office computing group, said interest in such a system has picked up substantially in the last year. "In the next couple of years, image processing will be as active a market as business graphics today," he added.

Before image processing, bales of paper documents became the stuffing material for endless file cabinets.

For its PIC system, Wang has targeted the professionals and managers as the potential market. Ri Regina, a Wang marketing manager, said one example of the value of the system is the ability to key in whole documents, including handwritten notes in the margins. "Sometimes the most important thing about a document is that handwritten note. It may affect the entire impact of the document. Before, you couldn't key that into the system. Now you can key it in and send it through electronic mail."

"The market," said Harold Kinne of Future Computing, Inc. in Richardson, Texas, "has outstanding potential."

Thibault added that as soon as vendors conquer the OCR question and cut storage costs, image processing will be mandatory. "The only missing piece of the OA puzzle then will be voice processing." **OA**

Rifkin is a staff writer for Computerworld OA.

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Micros and MIS: Bridging the Gap

A micro to mainframe link has not been perfected yet. Even when the technology is ready, a number of issues will need to be resolved.

ILLUSTRATION BY KATHERINE MAHONEY

By Jim Rutledge

The proliferation of personal computers is a mixed blessing for corporate DP or management information systems (MIS) managers.

On one hand, the responsibility for applications development is distributed to the department where the problems are understood. This allows the DP manager to avoid the tremendous applications backlog problem that has plagued DP departments for the last 10 years. Central DP departments have simply been unable to respond to user requests for new applications. Backlogs in excess of two years are not uncommon.

On the other hand, however, this distribution of applications development has created a nightmare for the DP manager, who must maintain intersystem compatibility and data sharing. Central DP owns and controls the data for the corporation. A breakdown in this data management function would result in complete data anarchy.

Information contained within the corporate data base is the most up to date and accurate. Until recently, however, the growing number of personal computer users within corporations had no direct access to that corporate data via their personal systems. In many cases, if the user attempts to get corporate data, he must still go through indirect and convoluted means, spending considerable time formatting that data for use in the personal computer.

Consequently, many personal computer users do not and cannot base their processing and decision making on valid corporate data. The processing result might be tidy and thorough, but it is only as good as the data used to arrive at an answer. If there were some way to provide a path between the microcomputer and mainframe (especially mainframe data and data base techniques), the value of the smaller systems would be enhanced immeasurably. Practically no one doubts that the personal computer is a valuable decision-support tool anymore. New spreadsheet tools, coupled with lower pricing and increased memory and storage capacities, have brought respectability to the personal computer.

In short, if personal computers and microcomputers could be integrated into the corporate data base and DP environment, the full potential of both the machines and the users would be unleashed. A corporation's knowledge would be turned into wisdom, resulting in meaningful and usable reports for effective decision making.

Some new product offerings are aimed at satisfying the above requirements. Software-only solutions are constructed around terminal emulator packages; other products combine both hardware and software (see Figure 1 on Page 83). Most products fit the first category: They attempt to glue these two diverse computer classes (mainframes and micros) with software adhesive. Without a doubt, an answer to the problem can be fashioned using software. The question remains, however, whether that is the best solution.

From the end user's standpoint (in this case the user who has a personal computer), the software-only solution does provide access to the corporate data. But this solves only one dimension of the total problem. Emulating a 3270 terminal, for example, allows access to mainframe data, but it also thrusts the personal computer user back into the environment from which he was trying to escape. He has two choices: He can use existing inquiries, which are rigid and difficult to use; or he can attempt to get new inquiries written, which will put him back into the two-year applications backlog arena. By choosing to emulate a 3270 terminal, he has also eliminated the inherent power of the personal computer which attracted him to it in the first place.

If, however, the personal computer is emulating a batch terminal — for example, 2780/3780 protocol — the user has access to larger amounts of data.

But will that data be in a structure that is useful to him?

Mainframe data is usually structured within a data base management system (DBMS) that provides users many tools for accessing and updating data. These benefits are negated if the data is restructured into a flat file for transmission to a remote "workstation" — in this case, a personal computer. What the personal computer user wants and needs is a DBMS capability and supporting data structure at his machine.

Remember also that the personal computer was originally attractive to the user because it was easy to use and gave him access to a great deal of off-the-shelf software that could be readily tailored to fit his problems.

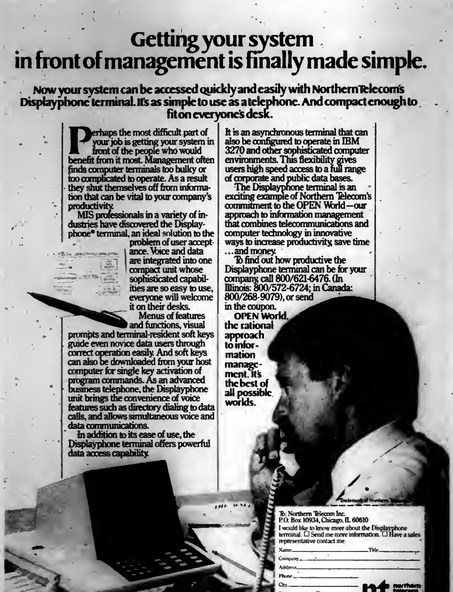
The software-only solutions for tying the mainframe to the microcomputer system do not generally provide the bridge between these personal computer tools and the data structure provided by the mainframe.

The mainframe-to-micro software solutions also create as many or more headaches for DP management. Central control of the data is still there to some degree, but how secure is that data when it has been moved to a personal computer with removable storage media?

Mainframe and data security can be rigidly maintained, but theft of downloaded data is often as easy as walking out the door with a floppy diskette.

Central DP financial managers are in for another surprise when they begin to tally up the costs of bringing personal computers into their existing

(Continued on Page 83)



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Building The Link

To be effective, a system tailored for data base management system (DBMS) tasks should link multiple users through dial-up or direct links. A multiuser operating system ensures that the users can share data locally without degrading the efficiency of the central computer. Furthermore, a relational data structure and query tools provide "ad hoc" data requests typically not available to micro or personal computer users.

Integrated applications software allows users to do word processing, create and manipulate spreadsheets, create menus and forms and communicate using electronic mail. Optimally, users should have the choice of subsetting data extracted from the mainframe, using it with their own applications.

The end-user interface must be simple and straightforward. Ultimately, requests for mainframe data become extract instructions to the mainframe DBMS.

In essence, the microcomputer acts as an intermediary between the mainframe and the personal computer user group. The system is linked directly to the mainframe; personal computers and user terminals hook onto the microcomputer system. By taking advantage of applications residing in the micro system, a company can spread that software across all users connected to the network, avoiding the cost of redundant applications on each micro.

Knowledge workers can access the data needed to make timely decisions based on accurate data. The end result is return on investment in both capital equipment and personnel.

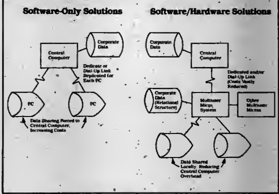
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Figure 1. Software vs. Software/Hardware

Obvious:	**Personal Computer**	**$ 3,500**
	Hard Disk	**2,000**
	Software	**1,000**
	Printer	**500**
	Total	**7,000**
Hidden:	**Local-Area Net Connection**	**200**
	Shared Large Peripherals	**5,000**
	Shared Pipeline Expense	**2,000**
	Shared DBMS Systems and Application Software	**2,000**
	Shared Mainframe Power	**2,000**
	Other	**8,000**
	Total	**$19,200**
Workstation Total Cost:	**Grand Total**	**$26,200**

Figure 2. Real Workstation Cost

Source: The Gartner Group

mainframe and communications networks (See Figure 2 for a cost analysis).

With the advent of the new multiuser systems like Bell Laboratories' Unix or Microsoft Corp.'s Xenix systems, coupled with some of the really good relational DBMS software now available for these systems, the combined hardware/software solutions to the mainframe-to-micro link appear to be the most complete answer.

DP managers also realize better results from the combined hardware/software solutions. They are still insulated from the applications backlog because the end user has the tools to solve most of his own problems. Mainframe connect costs are kept down because multiple users share the data locally. There is only one host connect for a multitude of users. Data security is also better maintained; the multiuser Xenix systems generally use nonremovable disk devices. In addition, because there are multiple users per system, data is shared locally and not on the mainframe. This results in saving mainframe resources as well as communications costs.

Multiuser microsystems have been used in this article as examples of hardware/software solutions, because, to date, they have tended to comprise the most comprehensive solution of any of the products positioned into the mainframe-to-micro marketplace.

It is noteworthy that most products being announced are coming from companies that have traditionally sold into the mainframe DBMS market — a fact that tends to underscore the importance of mainframe data in today's microcomputer technology.

Remember, decisions and answers are only as good as the data available. OA

Rutledge is product marketing manager for Intel Corp.

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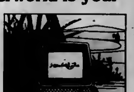

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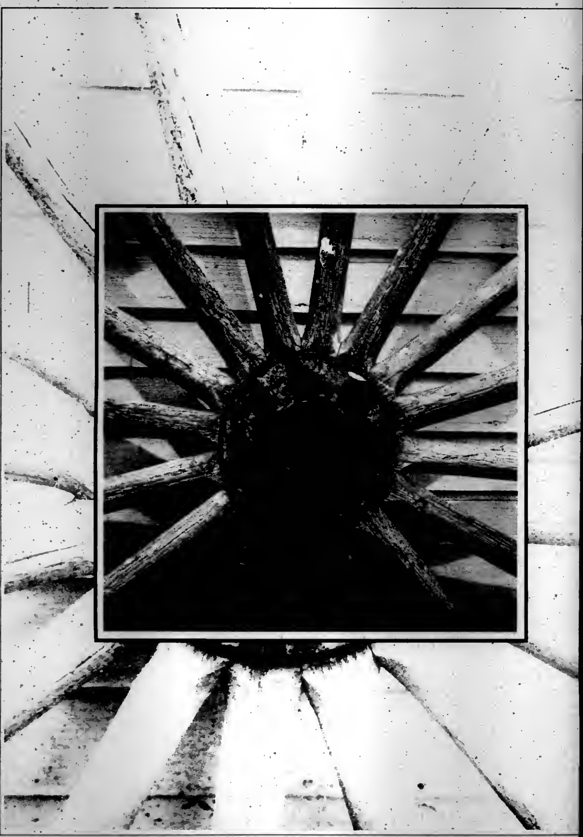

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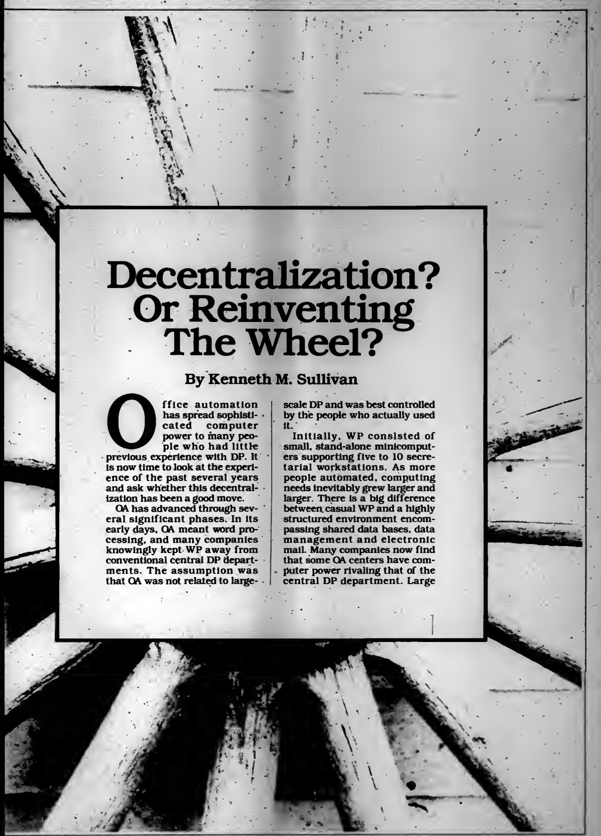


Decentralization? Or Reinventing The Wheel?

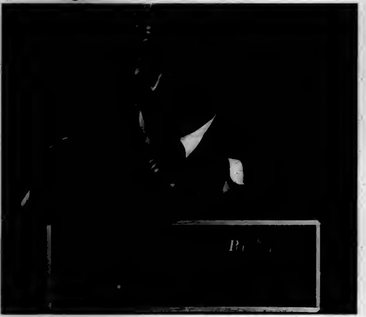
By Kenneth M. Sullivan

Office automation has spread sophisticated computer power to many people who had little previous experience with DP. It is now time to look at the experience of the past several years and ask whether this decentralization has been a good move.

OA has advanced through several significant phases. In its early days, OA meant word processing, and many companies knowingly kept WP away from conventional central DP departments. The assumption was that OA was not related to large-scale DP and was best controlled by the people who actually used it.

Initially, WP consisted of small, stand-alone minicomputers supporting five to 10 secretarial workstations. As more people automated, computing needs inevitably grew larger and larger. There is a big difference between casual WP and a highly structured environment encompassing shared data bases, data management and electronic mail. Many companies now find that some OA centers have computer power rivaling that of the central DP department. Large

"IBM terminals n
says PCI.



Your IBM CRT can communicate with ASCII hosts, like DEC, as if it was a DEC terminal. With a stroke of the key from your IBM CRT on your desk, you become instantly DEC-compatible. Your IBM terminal is now a DEC VT-100 CRT, thanks to the PCI 74D *de*converter from Protocol Computers, Inc.

You don't have to buy new terminals; you already own them.

Your IBM 3278 is a multi-function performer. Talk to DEC hosts, including those running the Unix and VAX/VMS operating systems. Talk to Dow Jones™ News/Retrieval Service for the latest stock information. Dial-up The Source. Connect to your Local Area Networks. The PCI 74D makes previously inaccessible time-sharing and private ASCII networks instantly available.

With the stroke of the key, you're back talking to IBM.

The PCI 74D switches your IBM 3278 terminal into the ASCII mode when it receives a specific keyboard command sequence. Suddenly the asynch ASCII world is at your fingertips. And just as easily, with another stroke of the key, you're back to IBM.

The PCI 74D resides between the IBM controllers (3274s and 3276s) and the hosts (IBM and ASCII). Connections to the controller or host can be either direct or through a modem. The PCI 74D is transparent to the IBM host.

Full capabilities, both worlds.

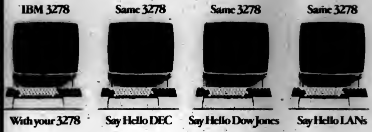
When your 3278 is in the ASCII mode, it can be a DEC VT-100 or TTY-compatible terminal. When your 3278 switches back to IBM, it regains its IBM screen capabilities, its 3278 identity. It's a split personality terminal, with the PCI 74D.

If you'd like to hear more about how to make your IBM world non-IBM compatible, get a dialog going with PCI today. To start your conversation, here's how to speak the language.

Glossary:

ASCII (American Standard Code for Information Interchange). The language spoken by DEC, not by IBM (without PCI).
ASYNCHRONOUS Start-stop communications technique used by low-cost low speed ASCII terminals and Personal Computers.
CoaxFACE™ Exclusive PCI device provides RS232C interface to coax cables for attachment of ASCII terminals to PCI converters.
DEC Digital Equipment Corpora-

ow speak to DEC,”



tion. Used here as synonym for an ASCII host.

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PCI (Protocol Computers, Inc.) We make the non-IBM world IBM compatible. Now we make the IBM world non-IBM compatible, too.

SDLC (Synchronous Data Link Control). Line protocol for data communications between IBM systems and terminals.

SNA (System Network Architecture). IBM's approach to data communications networking.

SNA/SDLC IBM communications; non-compatible with DEC (ASCII) communications (without PCI).

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3178 IBM low cost CRT.*

3287 IBM's printer.*

*All non-compatible with DEC (ASCII) without PCI.

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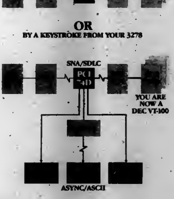

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PCI 1071: ASCII to BSC 3270 emulation.
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PCI's X.25 Series: PCI 73SX and PCI R73SX, SNA/SDLC to X.25 protocol converters for host and terminal connections respectively; PCI 1076X, ASCII to 3270 SNA/SDLC through X.25 networks, PAD included.
PCI's Networkers: Keystroke for keystroke 5251/11 and 3278 keyboard compatible ASCII CRTs.
PCI's IBM-PC software packages: For 3270 and System 34/36/38 emulation.

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PCI Making the non-IBM world IBM compatible.

computers can do much more than basic word processing.

When excessive computer capacity exists, two things generally happen:

- Practitioners search for additional applications to fill their computers.
- Users become more sophisticated and begin developing their own DP applications to enhance job performance.

When these two trends occur, large OA installations begin competing with central computer facilities.

At McAuto, a computer service bureau and a division of McDonnell Douglas Corp., we have worked with both centralized and decentralized OA techniques. We have found that different user groups have different and sometimes incompatible needs.

Different user groups have different and sometimes incompatible needs.

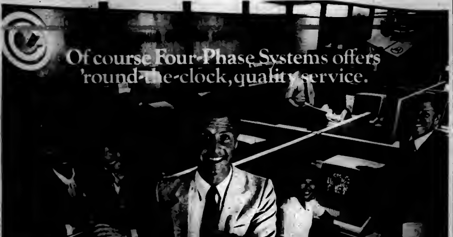
Serious modern WP began at McAuto and its parent corporation in early 1980. Initial installations consisted of dedicated small minicomputers with single-application WP software.

McAuto has a significant investment in large-scale IBM computers. Initially there was concern that OA would lead to a serious duplication of computer resources. However, IBM was slow in implementing OA software on central mainframes, and this allowed stand-alone WP to gain a significant foothold within the corporation. Eventually, IBM offered mainframe-oriented OA software, its Professional Office System (Profs). McAuto immediately implemented the software under the VM/CMS operating system on 4300 and 3033 class equipment.

Fundamental differences exist between Profs and standard WP systems running on dedicated distributed computers. Obviously, Profs runs in a shared environment on central mainframes. But there were other differences that were not initially apparent to the average user of McAuto services.

As implemented on dedicated minis and micros, WP is extremely user-friendly. Software and hardware are designed with the user, usually a secretary, in mind. Keyboards use an icon approach: Key symbols help operators perform tasks such as lookup, filing, block moving, insert and delete. Screen menus carefully lead the operator through various options in a way that is almost self teaching. The hardware itself is visually appealing and attractive in most office environments. Word processors have been designed with professional secretaries in mind. The assumption is that numerous short and medium-length documents will be done on a repetitive basis.

Manufacturers have enhanced their software to include information storage and retrieval and even low-level forms of DP. But with increasing sophistication, these systems become less like the friendly WP systems that started the whole movement. Ultimately, a point is reached where data management and telecommunicating are required. Stand-alone computers support secretaries extremely well because the machines are dedicated. Tying distant word processors together, however, is not a trivial ac-



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The fact is, many companies brag about the power of their computers, but very few about the performance of their service. They make a lot of noise about their hardware and software, but when it comes to service, they clam up, or promise what they can't deliver. Let's face it, very few companies have the resources to offer both a quality product and quality service.

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tivity. Various network techniques are available, but they are expensive and require significant commitment from the entire corporation. Networks require acquisition of communications equipment, dedicated telecommunications lines, technicians and managers. And all this communicating turns the average secretary into the controller of a switching center.

What started as the simple replacement of typewriters then becomes an intricate computerized communications network.

Profs is generally not considered as user-friendly as most conventional WP systems. The biggest reason is that 3270-type terminals must be used.

McAuto managers realized a centralized approach to OA was appealing because it made use of existing mainframes. In most cases, inexpensive terminals were the only hardware needed to give a user full OA capability through products such as Profs.

Proponents of distributed and decentralized processing have often criticized this centralized approach, but this criticism has generally lacked any quantitative backing. What these critics are really saying is that dedicated computers are desirable primarily because the user exerts substantial self-control over his resources. For example, there is no concern over slow response during peak-hour bottlenecks that central DP operations inevitably face. In addition, small computers seem to be more reliable than bigger machines.

The question that is seldom considered is whether the decentralized approach actually saves any money.

Profs is generally not considered as user-friendly as most conventional WP systems. The biggest reason for this is hardware, specifically the 3270-type terminals that must be used. Most companies with IBM computers already have large numbers of these video terminals; access is easy and inexpensive because no new equipment is required. However, the principal disadvantages are that 3270s deal with information one screen at a time, thus scrolling is not possible and, since the keyboard is generalized, it has no visual icons to help invoke WP commands. Many secretaries find it inconvenient to remember, for example, that PF10 (program function key 10) advances the screen. They would prefer something like an upward arrow. Using the 3270 requires mental conversion to do many tasks.

However, this type of problem has little long-term effect. An experienced operator using Profs is no faster or slower than a seasoned secretary using a dedicated word processor. Any differences are caused by personal taste rather than technical capability.

When telecommunications becomes a part of OA and OA expands into the world of decision support, the capability pendulum begins to swing toward centralized computing. As always, there are tradeoffs, but central computers have some very important positive points:

- Most large central computer installations have mainframes that communicate with each other; as a result, incoming OA applications have a rich variety of resources to draw upon.
- Mainframe installations have developed sophisticated communications networks that generally reach to all corners of the corporation.
- Mainframes have huge amounts of on-line storage capacity.

These capabilities fit nicely with sophisticated OA requirements. If sending documents between terminals is required, why create another network when one already extends from the central computer complex? Profs takes advantage of central computers with its implementation of electronic mail, for instance. Documents to be mailed are filed in one central storage area on a mainframe. The receiving terminals

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are simply told that a document exists. When ready, the recipient accesses the central file for the document. This technique ensures instantaneous transmission.

Most conventional word processors use the "post office" approach, where an attempt is made to send a document directly to the receiving terminal. This is a hit-or-miss situation, and retries are necessary when there is line or terminal contention. Significant delays between sending and receiving are normal.

The true benefits of Profs are realized when managers, rather than secretaries, begin exploring OA. For nonclerical people, document preparation is not as important as the capability to communicate with a companywide base of terminals. Since short memos and notes are generally the extent of a manager's WP needs, sophisticated keyboards and text preparation techniques are seldom needed.

Perhaps the most important advantage for the busy executive is that data storage is handled by professionals in the central machine room. Distributed word processors depend on floppy diskettes or small hard disks located in user areas. Data storage is an important, time-consuming user responsibility. Under a centralized approach, this responsibility is shifted to the DP department, where elaborate backup techniques have already been developed.

If a corporation is worried about the proliferation of information caused by decentralized computers, then moving back into the central machine room has merit. There is a growing concern that companies have allowed too much decentralization of processing power. Communications between diverse pieces of hardware is difficult. Data tends to be duplicated and can become inaccessible to people with legitimate requirements. Many users who should be doing other things become highly paid computer operators.

If a corporation is worried about proliferation of information caused by decentralized computers, moving back into the central machine room has merit.

Central computer facilities are viable and will remain that way precisely because of the problems inherent in distribution. Small computers are incredibly powerful and advance in capability yearly. Raw power, however, will never justify dispersing important corporate data bases. Issues of security, integrity and control are what continue to justify central machine rooms.

The central DP operation will always be around, and concepts like Profs make sense because they use existing resources to provide OA. Availability of in-place communications networks is an important aspect of this approach, and comprehensive data management and retention is a powerful fringe benefit.

For some, centralization is not a particularly exciting approach to OA — very little hardware is placed in the user's possession. A big part of distributed WP's success for secretaries has been that it gave users a chance to acquire computer equipment that enhanced and upgraded their jobs. Managers are not looking for job enrichment; they are looking for tools that will help them compete more successfully.

Using the power and telecommunicating capabilities of large computers is an important strategic choice. It cuts through the continual arguments about network architecture and equipment compatibility.

Centralization has some important advantages — it's here now, it works, it gives the manager what he needs in OA and it requires only a trivial capital investment. **OA**

Sullivan, manager of accounting for McAuto, teaches computer science at Golden West College in Orange County, Calif., and has recently published a book entitled Practical Computer Cost Accounting.

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The IBM 3270 PC

NEW YORK — **IBM**, in what many industry analysts have termed the most significant office products announcement this year, unveiled its PC XT/370 and 3270 PC.

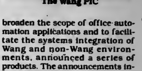
The PC XT/370 reportedly allows users to connect to a host processor operating under the VM/CMS operating system. This reportedly gives the desktop user all the power of the mainframe.

The IBM 3270 PC, which lets users tap the power of multiple host processors while retaining local microcomputer capabilities, allows users to run concurrently up to seven applications, four of which can emanate from a larger host, such as the 4300 or 3080 series.

The 3270 PC's windowing capabilities give IBM functionality similar to the Xerox Corp. Star and Apple Computer, Inc. Lisa workstations. For the PC XT/370, IBM also announced a control program that it said permits users to run many 370, 4300 series and 30 series programs unchanged on their desktops using familiar program languages and command procedures.

The PC XT/370 is priced at $8,995; the 3270 PC sells for $5,585. More information is available from IBM, Information Systems Group, 900 King St., Rye Brook, N.Y. 10573.

LOWELL, Mass. — **Wang Laboratories, Inc.**, in an effort to broaden the scope of office automation applications and to facilitate the systems integration of Wang and non-Wang environments, announced a series of products. The announcements included the following:


The Wang PIC

- The Wang Professional Image Computer, a system that utilizes a camera to scan images from a document; digitize the images; and then display, store, retrieve, alter or merge with text, and transfer those images. The PIC system is offered in several configurations priced at $12,115 to $26,750.
- Wang Office, a series of network-based software applications for Wang systems that provide time and task management, communications and information management tools.
- The Information Distribution System, a family of software products providing a pathway that supports services and applications between Wang VS systems and an IBM or IBM plug-compatible host over an IBM 3270 Systems Network Architecture or binary synchronous communications network.
- WP Plus, a new word processing editor.
- The Wang Professional Application Creation Environment, a relational data base management system and a set of application development tools for the VS computer family.
- Wang Systems Networking, a framework for Wang networking products.
- A new VS operating system environment with Unix support.
- The availability of the Wang Word Processing System Document Communication Specification and the Wang Information Transfer Architecture.

For more information contact Wang Laboratories, Inc., One Industrial Ave., Lowell, Mass. 01851.

MAYNARD, Mass. — **Digital Equipment Corp.** announced its Microvax-1, a 32-bit microcomputer capable of using many of the same programs as the VAX-11/780, the company's flagship superminicomputer.

Amid the clamor of exaggerated office automation claims, we hesitate to add to the din. But here at last is a product that can do just about anything you ask of it.

It's the Lanier Business Processor, newest brainchild of the company that's been a driving force in office automation for over forty years. Built into it are decades of experience at helping businesses be more efficient, be more productive, and streamline, streamline, streamline.

The Lanier Business Processor does indeed do virtually everything. A word processor that excels as a personal computer. A personal computer that out-word processes even machines designed to do nothing else. A workstation that can be networked to other Lanier systems or communicate via SNA through your host network. It's a modular business tool that you can add to, as your company's needs expand. You cannot outgrow it. It will never become obsolete.

You don't have to be an engineering genius to penetrate the secrets of the Business Processor, either. Thanks to Lanier's exclusive One Step™ system, it's incredibly easy to use. Within minutes you can take control: Your users waste less time becoming proficient. Non-typist executives, particularly, can use powerful spreadsheet tools or advanced word processing features in no time.

But revolutionary as our Business Processor is, expandable as it is, versatile as it is, what really sets it apart from the crowd is the depth of support we put behind it. Lanier offers you real person-to-person help. No canned pitch that never varies for us. We tailor each demonstration to your specific user needs. You see *exactly* how the Business Processor can fit into your office automation strategy. What's more, we'll work directly with your users, or through your Information Center.

We train your people before the equipment arrives. We watch over the installation like hawks to make sure it goes smoothly. Once your system is installed, if you have questions, our response is to send a real person, not hand you an '800' number to call.

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The desktop system represents the first step toward putting the VAX on a chip, according to DEC. The Microvax-1, intended for industrial, scientific and business use, will support as many as eight users simultaneously, DEC said. It holds 512K bytes of internal memory.

The unit, designed for runtime and memory-only applications sells for $9,995 from DEC, Maynard, Mass. 01754.

CAMBRIDGE, Mass. — PC/204, a four-product software link between IBM PCs and IBM mainframes, has been announced by **Computer Corp. of America** (CCA). The product is based on CCA's Model 204 data base management system architecture and incorporates Lotus Development Corp.'s 1-2-3 spreadsheet program.

The PC/204 contains communications capabilities, software integration, retrieval capabilities from the mainframe and a distributor capability that allows applications written in Model 204 user language to be executed partly on the mainframe and partly on the PC.

The PC/204, set for the first quarter of 1984, will cost $10,000 for the CPU with the Communicator, Retriever and Distributor package an additional $750 per PC from CCA, Four Cambridge Center, Cambridge, Mass. 02142.

COLUMBUS, Ohio — **Compuserve, Inc.** introduced its Executive Information Service, designed to offer the business executive access to business information. It features a comprehensive package of financial data, current news, decision-support research and communications options.

The service costs $139.95 for a hookup to the IBM PC; a standard hookup to any other personal computer is $89.95 from Compuserve, 5000 Arlington Centre Blvd., Columbus, Ohio 43220.

ROCHESTER, N.Y. — **Xerox Corp.** has unveiled its 5-lb portable briefcase computer, the Xerox 1810.

The product has a self-contained power source and offers a built-in appointment calendar, clock with alarm, four-function calculator, tape recorder and teletypewriter. It has 64K memory, LCD display screen and can reportedly operate up to 10 hours on rechargeable batteries. Its 8-bit processor is compatible with all CP/M software.

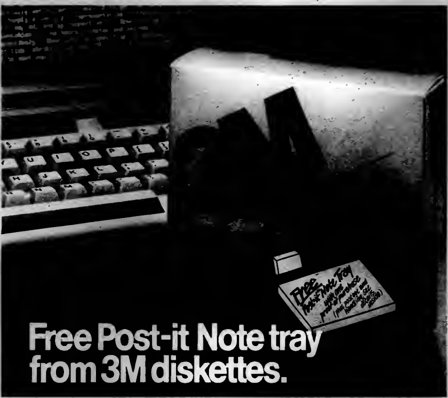
The recommended list price is $2,195 from Xerox Corp., Xerox Square, Rochester, N.Y. 14644.

DALLAS — **Philips Information Systems, Inc.** has introduced six new office automation products: the Information Processing System, a 32-bit superminicomputer that supports Philips workstations; the Conversational Management Information System, a mainframe resident software system that brings administrative and decision support capabilities to the workstation level; Megadoc, an advanced-technology laser-disk mass storage and retrieval device; the 3005 universal workstation, which adds hard-disk storage to the 3000 Series workstation family; the 1002, a cost-effective workstation for basic word processing and communications; and a local-area network.

For more information on the products, contact Philips Information Systems, 4040 McEwen, Dallas, Texas 75234.

WESTLAKE VILLAGE, Calif. — **Wordplex Corp.** announced two personal business computers — the Wordplex Desktop PC and the Wordplex Portable PC. Both are 16-bit microcomputers with 8088 microprocessors.

The main board has a minimum of 128K bytes of random-access memory internal memory and can support up to 512K bytes of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memory. A fast-access 320K-byte double-sided floppy disk is standard on both models, with a second double-sided floppy or 10M-byte Winchester drive available as options. Both models are IBM-compatible and can run most software packages designed to run on the IBM PC. The Wordplex Desktop PC costs $2,696; the portable is $2,926 from 141 Triunfo Canyon Road, Westlake Village, Calif. 91361.

Apple Computer, Inc. has announced the Apple III Business System designed specifically for small to medium-size businesses. The system consists of an Apple III personal computer system with 256K bytes of memory and a built-in floppy disk drive; Profile, Apple's 5M-byte hard disk; a 12-in. monitor; Catalyst 2.0 Program Selection software from Quark, Inc.; and a system utilities product training pack. The system is priced at $5,330 from Apple Computer, Inc., 10260 Bandley Drive, Cupertino, Calif. 95014.

DALLAS — A desktop facsimile terminal that reportedly can communicate with computers and be integrated into office automation networks has been introduced by **Xerox Corp.**

The Telecopier 295 digital facsimile transceiver can receive computer information for printing or for redistribution to other facsimile units located anywhere around the world. The system is said to send and receive a page in less than 30 seconds.

The Xerox 295 has a base price of $4,600 from Xerox Corp., Office Products Division, 1341 W. Mockingbird Lane, Dallas, Texas 75247.

ELMWOOD PARK, N.J — **Fox & Geller, Inc.**, a developer and manufacturer of software for personal computers, has announced a business software tool called OZ: Management Control. OZ reportedly integrates data analysis, graphics and reports and offers managers financial control and three-dimensional views of data previously possible on mainframes or minicomputer systems.

OZ is scheduled for release in January 1984 for the IBM PC for $500. For more information contact Fox & Geller, Inc., 604 Market St., Elmwood Park, N.J. 07407.

ATLANTA — **Lanier Business Products, Inc.** has introduced the Lanier Business Processor 1000, a professional computer designed to serve as a professional computer, network device and data communications terminal. The product reportedly can be linked with other workstations in the Lanier Business System 5000 Network.

In addition, it will interface with existing office data communications systems using its 3270 SNA, 3780 communications or teletypewriter-Ascii capabilities. The system has dual 8- and 16-bit processors and configurations which include 128K bytes or 256K bytes of memory and costs $2,995 from Lanier Business Products, Inc., 1700 Chantilly Drive, N.E., Atlanta, Ga. 30324.

PALO ALTO, Calif. — **Hewlett-Packard Co.** introduced a touch-screen personal computer called the HP 150. The system works by touching the display rather than by keying in or using a mouse. The HP 150 is designed "to be the easiest computer for first-time computer users," according to HP.

The HP 150 uses an Intel Corp. 8088 16-bit microprocessor to run Microsoft Corp.'s MS-DOS 2.0 operating system. Programs available on the system include: Visicorp's Visicalc; Wordstar from Micropro International Corp.; and Condor Computer Corp.'s Data Base Manager.

The HP 150 is available for $3995 from Hewlett-Packard, 1820 Embarcadero Road, Palo Alto, Calif. 94303. OA

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Dec. 7-8, New York — **Data Base Management Systems: Comparative Evaluation.** Also, New York, Feb. 8-9. Contact: Datamation Institute, Suite 803, 331 Madison Ave., New York, N.Y. 10017.

Dec. 12 and 14, New York — **PC Communications.** Contact: Women in Data Processing, Suite 2008, 310 Madison Ave., New York, N.Y. 10017.

Dec. 12-14, Washington, D.C. — **Personal Computers and Networking.** Also Dec. 14-16, Philadelphia; and Dec. 19-21, Irvine, Calif. Contact: Center for Advanced Professional Education (Cape), Suite 110, 1820 E. Gerry St., Santa Ana, Calif. 92705.

Dec. 12-15, Boston — **Conference on Human Factors in Computing Systems (CHI '83).** Contact: General Chairman Raoul N. Smith, GTE Labs, 40 Sylvan Road, Waltham, Mass. 02254.

Dec. 14-16, Washington, D.C. — **Local-Area Networks.** Also Dec. 19-21, San Jose, Calif. Contact: Cape, 1820 E. Gerry St., Suite 110, Santa Ana, Calif. 92705.

Dec. 14-16, Washington, D.C. — **Microcomputers: Tools of Today and Tomorrow.** Also, Jan. 11-13, Washington, D.C., and Feb. 6-8, San Francisco. Contact: The Institute for Professional Education, 1515 N. Court House Road, Suite 303, Arlington, Va. 22201.

Dec. 15-16, San Francisco — **Desktop Computer Local Networks Forum.** Contact: Architecture Technology Corp., P.O. Box 24344, Minneapolis, Minn. 55424.

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